IN TWO SECTIONS — SECTION ONE

THE PAPER INDUSTRY and PAPER WORLD

AN EDUCATIONAL NEWS MAGAZINE—APRIL, 1946

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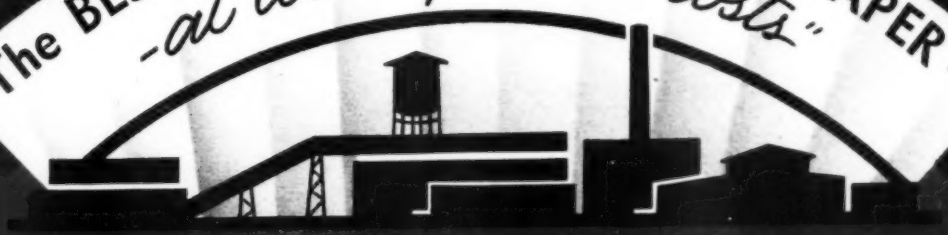

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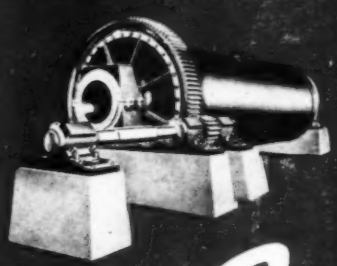

Patterson Machinery

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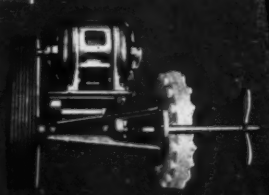

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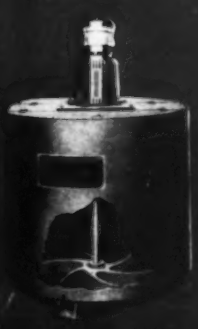

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in relation to your profits?

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A new line of cutting machines will soon be announced by Seybold. These are various sizes of the "*Sixty*" series, embodying all that Seybold has learned in more than sixty years of actual manufacture of cutting machines. Their design is more than engineering, more than experience with the man at the machine. It is the result of

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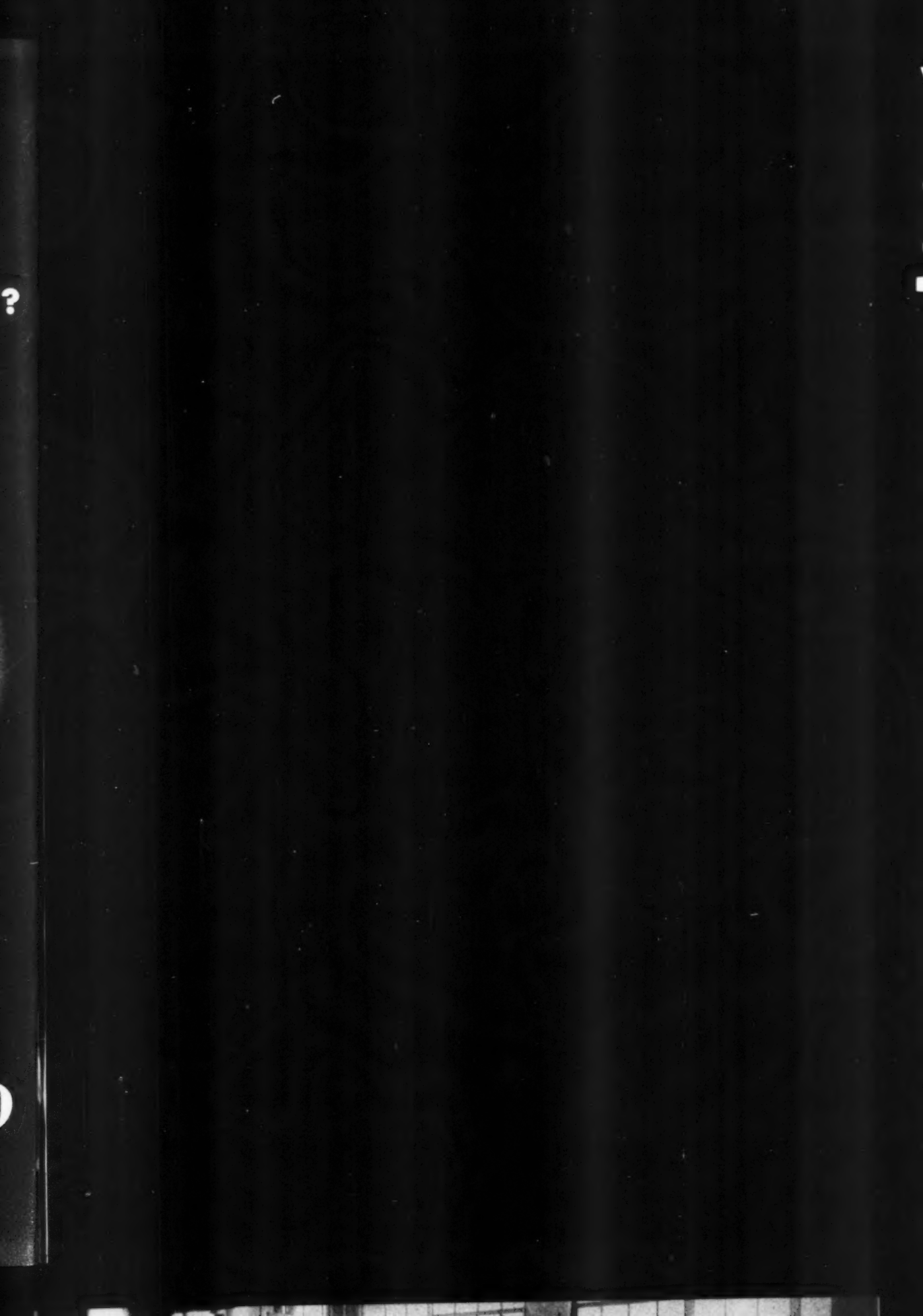

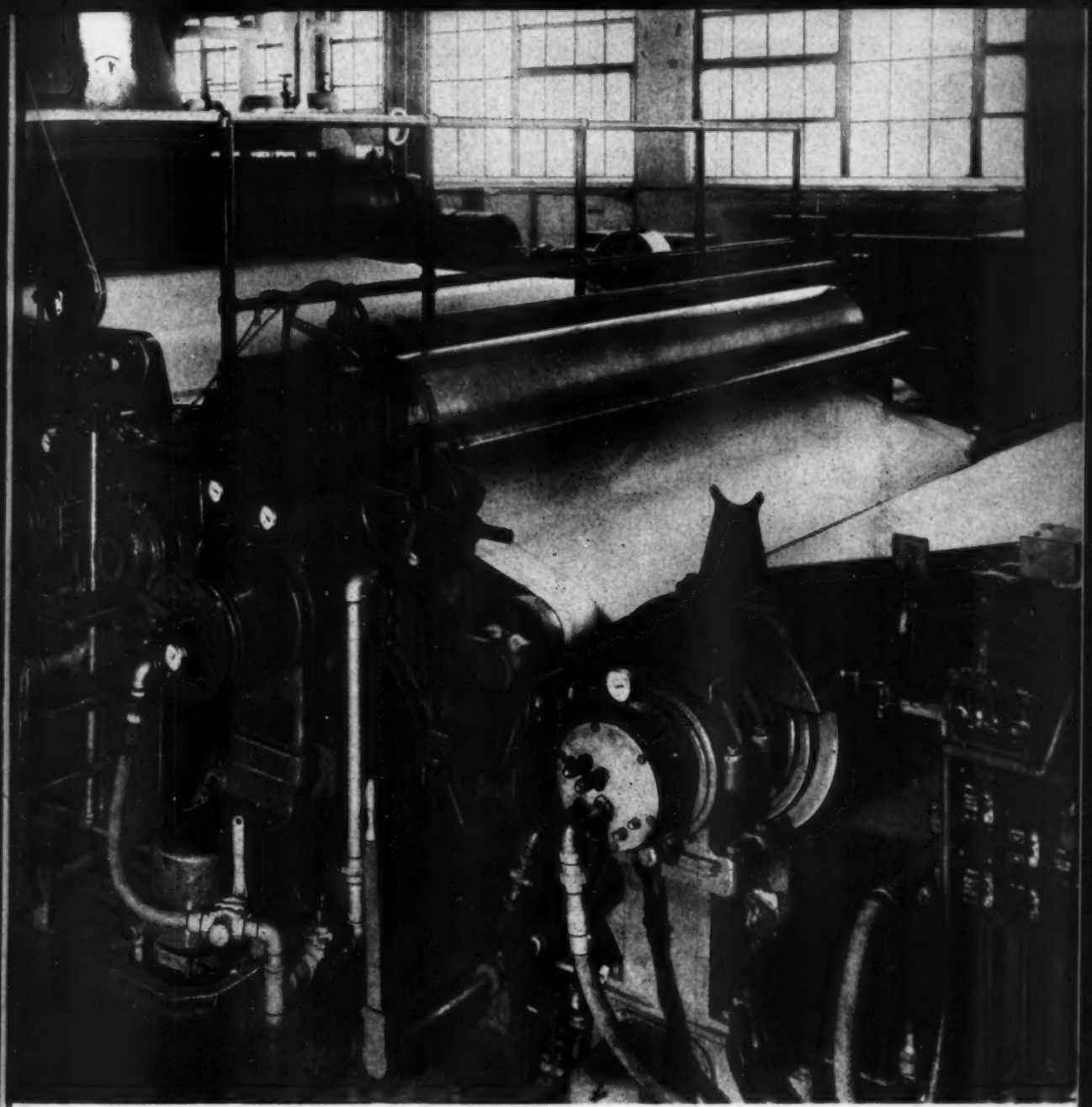

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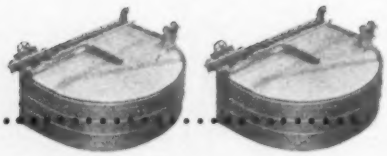

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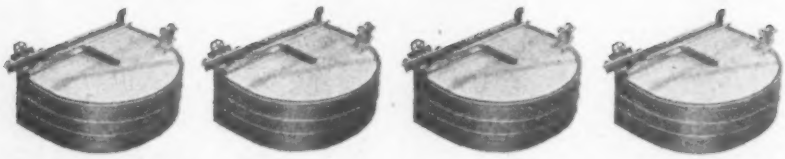
or quadruple



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THE PAPER INDUSTRY and PAPER WORLD

(Reg. U.S. Pat. Off.)

VOLUME 28 - - - - - - - - APRIL, 1946 - - - - - - - - NUMBER 1

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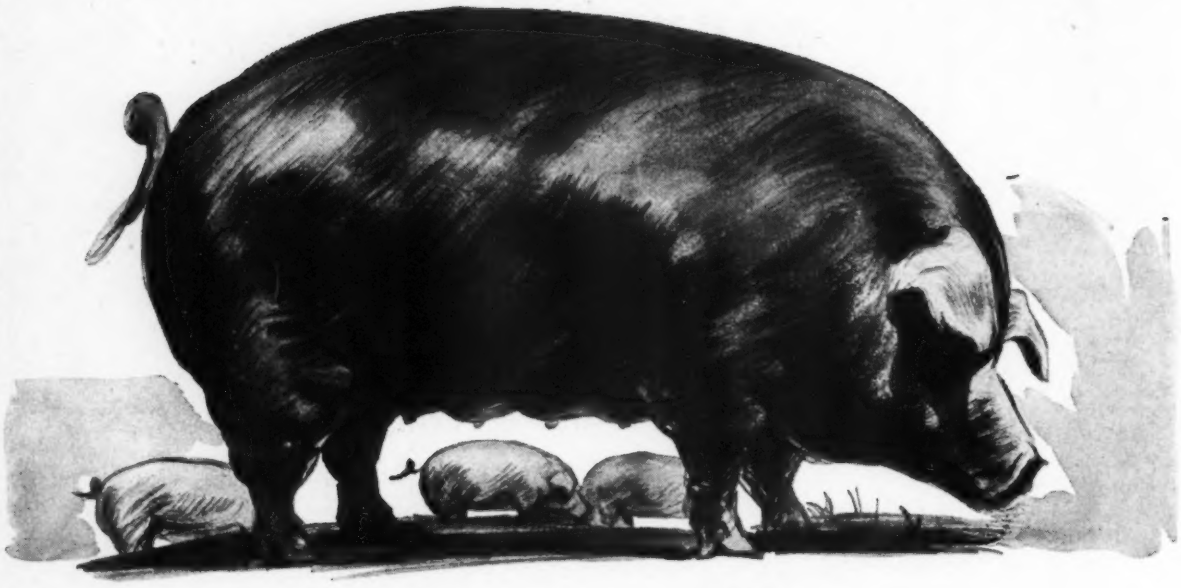

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Quantity preparation of paper board for wax coating and gloss ink printing requires a quality sizing job — quickly — easily — economically.

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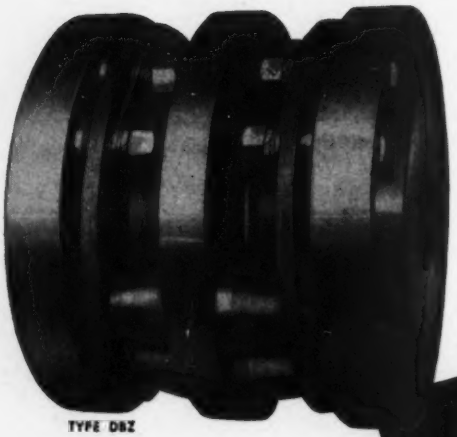
. . . proven to be 100% dependable on wood choppers, centrifugal pumps and other heavy duty machinery in the paper manufacturing industry



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Thomas Couplings are in perfect balance under all conditions of misalignment.

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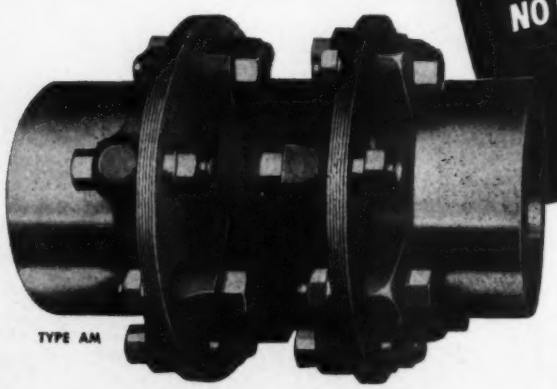
The Longer Life of Thomas Flexible Couplings, without costly interruptions and replacements will add much to Your Operating Profits!



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Thomas All-Metal Flexible Couplings do not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.

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This involves constant analysis of ingredients, rigid control of manufacturing processes and testing of the finished product each time that dye is produced.

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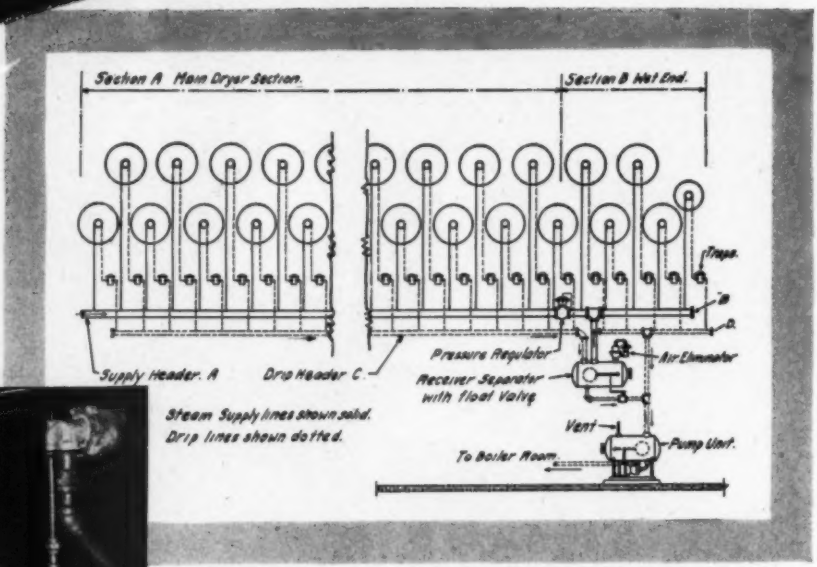

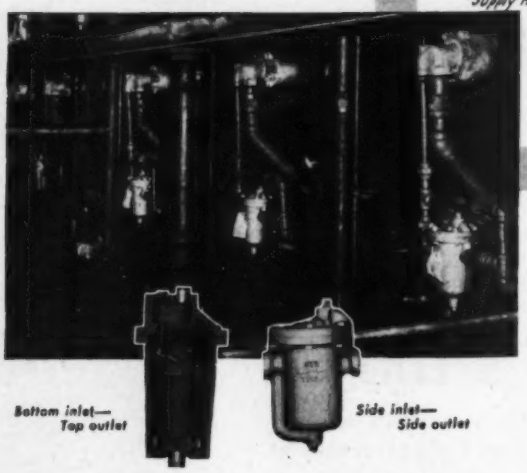

Armstrong provides a complete line of steam traps admirably suited to all requirements of paper mills. High capacity, compact design, ability to discharge air along with condensate, ability to discharge all ordinary dirt and scale without clogging, freedom from wire-drawing, stainless steel bucket and valve lever, chrome steel valve and seat (hardened, ground and lapped), choice of body styles — These are features that make Armstrong Traps popular with engineers who like trouble-free equipment. Available for pressures up to 2400 psi., capacities to 300,000 lbs. per hour.

For data, prices, capacities, material on condensate drainage practice, maintenance, trouble-shooting write for 36 page STEAM TRAP BOOK.

IF THERE ARE marked variations in individual dryer temperatures in the main drying section of your machine or if dryer temperatures are not up to maximum temperature possible with the steam pressure being used, it will be worth your while to check the benefits of an Armstrong Dryer Drainage System. Only if you have efficient drying can you realize full production and full return on the mill investment.

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- Removes all *air* as well as condensate. (20% air in a dryer at 10 psi. will reduce temperature 12° F.)
- Provides maximum temperature for all dryers on the machine.
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- Permits desired variation in steam pressure on any section of the machine by adjustment of steam control valve only.
- Completely automatic and quickly responsive to pressure changes.

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Tee flanged fitting

45-degree lateral flanged fitting

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Esco flanged fittings are available in 45- and 90-degree elbows, tee, long radius ell, cross, 45-degree lateral, and reducer. Sizes range from ½" to 10".

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Other products of Esco "know-how" which result from years of experience in the pulp industry, are stainless steel valves, screwed and socket-weld pipe fittings, Spuncast and fabricated stainless steel pipe. These are described in the new stainless steel Catalog number 157. We have a copy for you. Ask your nearest Esco representative for it, or write us direct.

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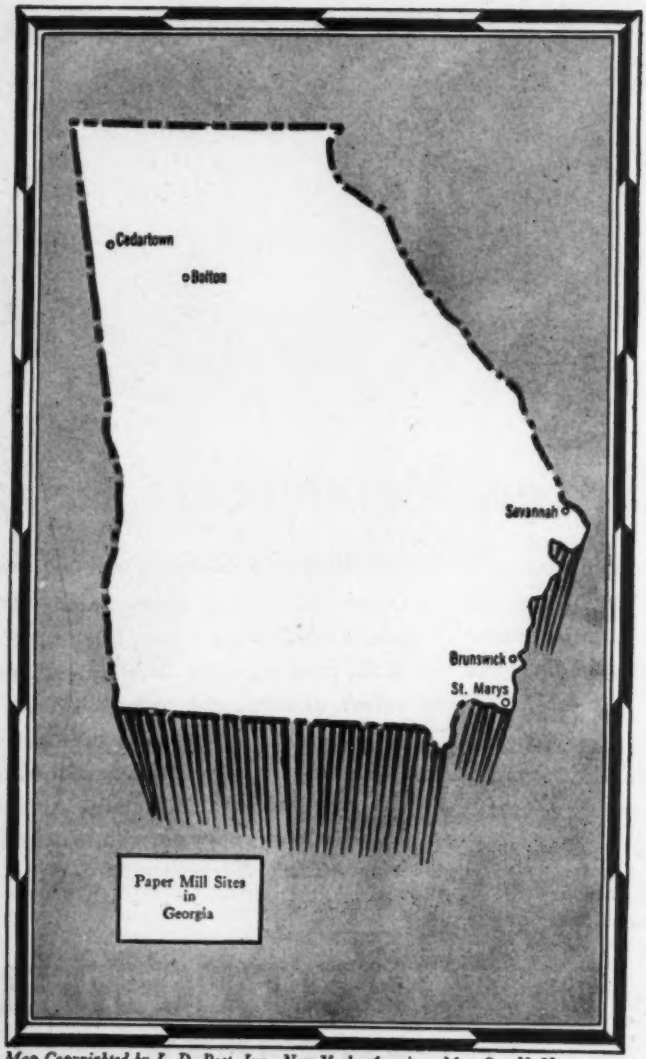
Draper's

ATLAS OF AMERICAN PAPERMAKING

No. 16 PUBLISHED BY DRAPER BROTHERS COMPANY • CANTON, MASSACHUSETTS



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HIGH LIGHTS:

A Georgia man, writing in 1846, called attention to the need of a paper mill in that section. He said that there was then no mill in Georgia. A century later and a miraculous change had occurred. The rated daily capacity of Georgian paper and pulp mills is 1030 tons as of 1945, and three new mills are in prospect!

The sudden rise of Georgia in the papermaking world within the last decade, stems from the research work initiated under Dr. Charles H. Herty, a native son, at The Chemical Foundation in Savannah. On November 20, 1933, nine leading newspapers in Georgia issued editions printed on the first commercial run of newsprint made from loblolly pine. This demonstration proving the availability of southern pine for printing paper in addition to kraft paper, was the most notable event in recent papermaking history. It foretells the reign of Paper where formerly Cotton was King.

Equipment includes five Fourdriniers and three cylinder machines, and twenty-one sulphate digestors.

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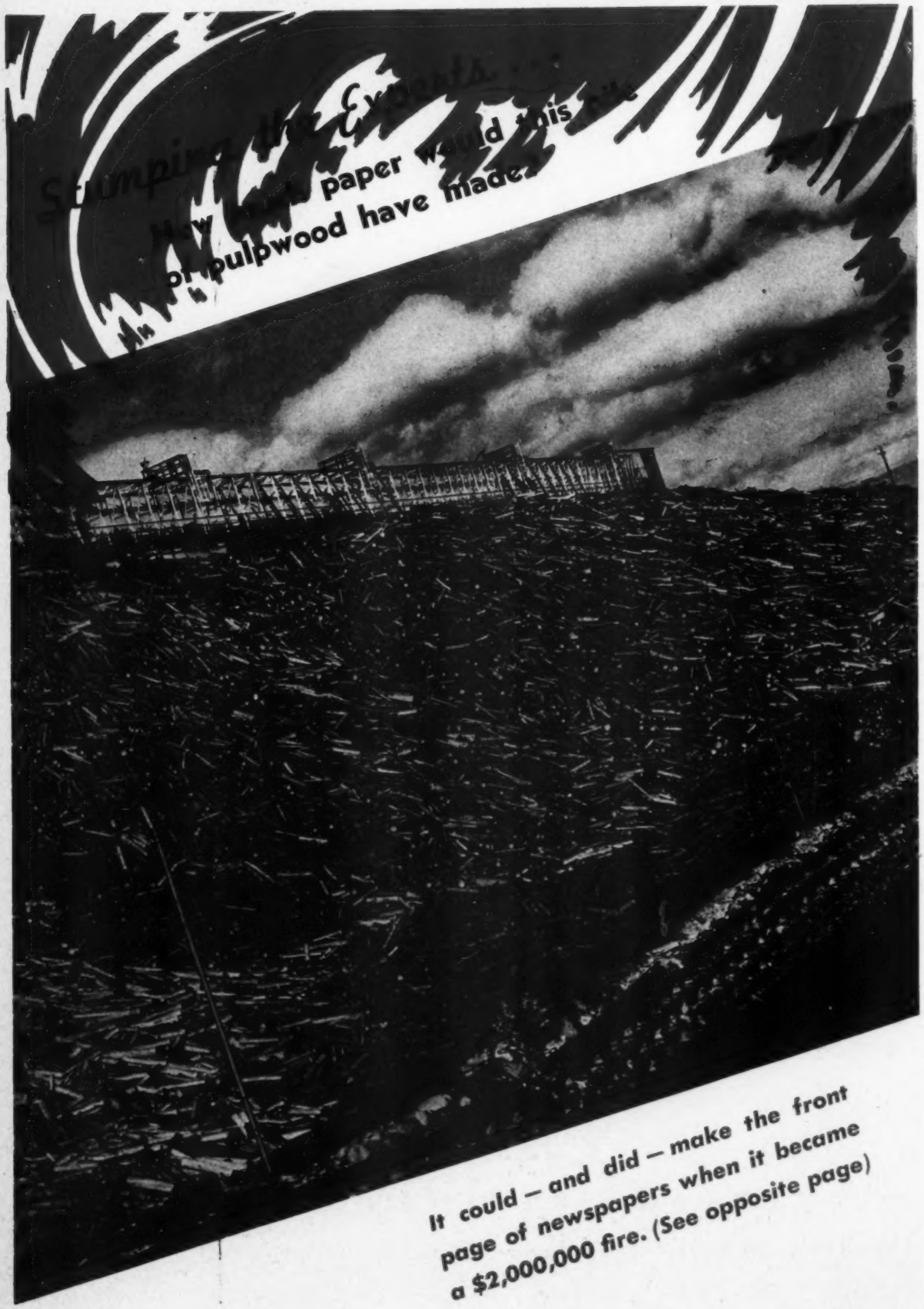


It could — and did — make the front page of newspapers when it became a $2,000,000 fire. (See opposite page)

TRADE WINDS

FIRE DESTROYS PULPWOOD PILE AND CAUSES DAMAGE TO HULL PLANT OF EDDY

A spectacular, though disastrous, fire destroyed a large pile of valuable pulpwood and caused damage to the Hull (Quebec) plant of E. B. Eddy Company, the night of March 28. The entire loss resulting from the fire was approximately $3,000,000. The burned pile of pulpwood and damage to the Eddy newsprint mill was estimated at $2,500,000, and just after the fire, it was stated that $500,000 would be required to repair the North approach of the interprovincial bridge over the Ottawa River, which was badly burned.

An item published in the Montreal *Gazette* states that a plan to beautify the area along the Ottawa River has been under consideration, and it was further stated an announcement had been made that the Eddy mill would be moved down the river several miles to take it outside the metropolitan area. As shown in the illustrations, the Parliament Buildings in Ottawa are on the South Bank of the river.

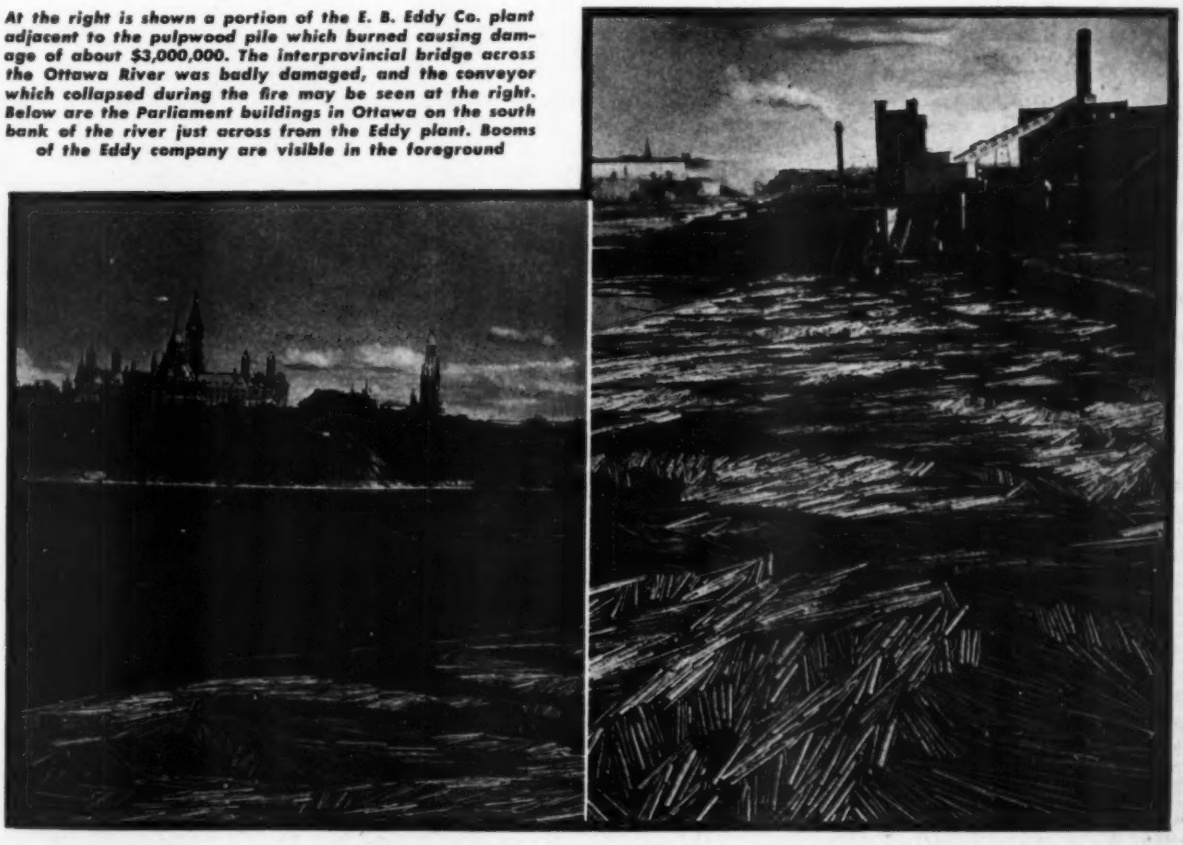
The Eddy plant is now controlled by Garfield Weston, former member of the British House of Commons and a prominent Canadian industrialist.

◆

FINANCIAL

The easing of the foreign situation and the termination of serious strikes resulted in an upward surge of stocks and bonds in the nation's securities markets, and a material recovery from

At the right is shown a portion of the E. B. Eddy Co. plant adjacent to the pulpwood pile which burned causing damage of about $3,000,000. The interprovincial bridge across the Ottawa River was badly damaged, and the conveyor which collapsed during the fire may be seen at the right. Below are the Parliament buildings in Ottawa on the south bank of the river just across from the Eddy plant. Booms of the Eddy company are visible in the foreground



the law prices which marked the pessimism of earlier weeks of the year. Paper mill securities followed the trend upward, even though they had not suffered as severely as other industrial stocks, and in many cases prices at the end of March were close to the high points for many years past.

American Writing Paper Corporation—Net profit in 1945 was $150,611 as against $184,312. Fourth quarter operations, however, showed a loss and plans for plant renovation have been deferred because of an inability to establish a better relationship between production costs and OPA ceiling prices. Dividend payments meanwhile will also have to be deferred.

Celotex Corporation—Net income for three months ended January 31, 1946, was $366,684 as against $137,310 for the comparable period of a year ago.

Certain-teed Products Corporation—Net income in 1945 was $1,053,303 as against $692,168 in 1944.

Container Corporation of America—Net income for 1945 was $2,026,103 against $2,064,498 in 1944.

Crown Zellerbach Corporation—Net income for nine months ended January 31, 1946, was $5,706,189 as against $5,399,620 for the comparable period the previous fiscal year.

Eastern Manufacturing Company—Net income for 1945 was $1,646,467 as against $1,584,013 for the preceding year.

Robert Gair Company—Net profit for 1945 was $993,872.

P. H. Glatfelter Company—Net income in 1945 was $182,423 as against $174,711 in 1944.

Hammermill Paper Company—Net income for 1945 was $528,038 as against $453,395 in 1944.

Hawley Pulp & Paper Company—Net profit in 1945 was $134,134 as against $141,871 in 1944.

Hoberg Paper Mills—Net income for 1945 was $145,195 as against $161,366 in 1944.

Hollingsworth & Whitney Company—Net profit in 1945 was $590,946 as against $581,977 in 1944. The company has announced the issuance of a new preferred stock, consisting of 42,000 shares on a $4 dividend basis and will split its present common two for one. The $4,500,000 raised by this operation will be used for Maine and Alabama plants, including the purchase of $500,000 forest land in Alabama.

Hummel-Ross Fibre Corporation—Net profit for the three months ended March 31, 1946, was $162,881.70 as compared with $114,355.97 for a similar period in 1945. Net profit for the year 1945 was $133,618 as against $135,256 in 1944.

Kalamazoo Vegetable Parchment Company—Net profit for 1945 was $312,537.

Keyes Fibre Company—Net profit in 1945 was $238,773 as against $289,245 in 1944.

Marathon Corporation — An increase from 400,000 shares of common to 1,300 shares has been voted, stockholders to receive two for one in the new stock, the balance to be held by the company for later disposal.

Michigan Paper Company — Net earnings dropped in 1945, due to price ceilings, to $47,151.

Minnesota & Ontario Paper Company—Net income for 1945 was $1,549,042 as against $1,125,287 in 1944.

Nashua Gummed & Coated Paper Company—Net profit in 1945 was $478,611 as against $641,907 in 1944.

National Container Corporation—Net profit in 1945 was $1,185,920 as against $1,190,991 in 1944.

Oxford Paper Company—Net earnings for 1945 were $974,060 as against $899,195 in 1944.

Puget Sound Pulp & Timber Company—Net income in 1945 was $602,624 as against $938,287 in 1944.

Rayonier, Inc.—Net income for nine months ended January 31, 1946, was $916,997 as against $1,420,261 for the same period in the previous fiscal year.

St. Helens Pulp & Paper Company—Net profit for 1945 amounted to $264,337 as compared to $315,436 in 1944.

St. Regis Paper Company—Net income in 1945 was $2,211,411 as against $1,853,513 in 1944.

Scott Paper Company—Net income in 1945 was $1,756,205 as against $1,620,242 in 1944. The company proposes to increase its common stock from one to two million shares, and to create a new preferred issue of 150,000 shares. Sale of the new common stock to produce about $3,000,000 is to help defray the cost of improvements. The company plans to sell 64,115 shares of preferred to provide funds for the retirement of 29,780 shares of $4.50 preferred and 30,000 shares of $4.00 preferred.

Sonoco Products Company—Net income for 1945 was $93,132 as against $430,527 in 1944.

Union Bag & Paper Company—Net income for 1945 was $1,646,467 as against $1,584,013 in 1944.

United States Envelope Company—Net profit in 1945 was $819,193 as against $791,230 in 1944.

West Virginia Pulp & Paper Company—Income for the quarter ended January 31, 1946, was $1,047,071 as against $538,738 for the comparable quarter in 1945.

New York Stock Exchange—Stocks

	Closing Prices March 25, 1946	Feb. 25, 1946
A.P.W. Products ..	9⅛	8½
Celotex	28¼	25
Same Preferred ..	21⅜	21⅜
Certain-Teed Prod..	19	17
Same Preferred..	*110½-115	109
Champion P & F Co.	*48½-50	47¼
Same Preferred..	*111-111½	108½
Container Corp. ...	45¼	41⅝
Cont. Diamond ...	16	15¾
Crown Zellerbach..	36	31⅛
Same Preferred..	108	108¾
Same $4 Preferred	125	123
Dixie Vortex	45	39⅛
Same "A"	52¾	54
Robert Gair	10¾	9
Same Preferred..	20½	20
Gaylord Container.	58¼	40¾
Same Preferred..	115	83⅛
International Paper.	45½	41
Same Preferred..	118	112⅝
Kimberly-Clark	*60¼-62½	62½
McAndrews & Forbes	*37½-38½	36¾
Masonite	61	57½
Mead Corp	26⅜	20⅜
Same Preferred..	*105½-106	107½
National Container.	28¼	25½
Paraffine Cos	78¼	76
Same Preferred..	110	110
Rayonier, Inc.	26¼	22½
Same Preferred..	36⅛	37⅞
Scott Paper	58	55
Same 4½% Preferred ...	*108-109	*107½-109
Same 4% Pref...	*107½-108¾	109
Sutherland Paper...	43½	40
U. S. Gypsum....	125	110¼
Same Preferred..	204	204
West Va.-P&P Co.	41½	38¼
Same Preferred..	114	114

New York Stock Exchange—Bonds

Abitibi 5%	108½	108
Celotex 3¾%.....	...	...
Certain-teed 5½%..	...	...
Champion P&F 3%	....	105⅛
Int. Paper 5%....	102¼	103¼
Same 6%	...	108

New York Curb Exchange—Stocks

Am. Writing	10½	10¾
Great Northern...	39¼	39¾
Hummel Ross ..	12⅞	12½
St. Regis	10⅞	10
Taggart	9	9⅜
United Wall Paper	11	10¾

*Closing Bid and Asked Prices.

◆

CERTIFIED PULP TESTERS

An up-to-date list of pulp testers approved by the Certified Pulp Testers Bureau has just been published. Seventeen names are listed in pulp and paper mill laboratories and fourteen in commercial laboratories:

Pulp and Paper Mill Laboratories

Bradford, Harry C., Rex Paper Co., Kalamazoo, Mich.; Clark, Clarence T., Restigouche Co., Ltd., Campbellton, N. B.; Coburn, Andrew, Pacific Mills, Ltd., Ocean Falls, B. C.; Connor, C. M., Glassine Paper Co., West Conshohocken, Pa.; Coster, N. W., Soundview Pulp Co., Everett, Wash.; Enghouse, Clarence A., Crown Zellerbach Corporation, West Linn, Oregon;

PAPER · · · America's 6th Industry

PAPER TAPE FOR RECORDING SOUND

(NEWS ITEM: *Coated paper tape to record and play back sound is being used for home recorders.*)

Soon party-goers will have a lasting memory of the evening's fun—recorded on paper tape. A new type of home recorder which uses magnetically coated paper tape as the recording medium has just been announced. The paper tape allows erasing, permitting it to be used over and over again. Unwanted sections can be torn out, and the torn ends connected by any suitable adhesive.

There are thousands of new uses for paper. Filter paper for coffee makers . . . paper plates for frozen foods . . . paper covered steel core for box strapping . . . paper bags for packaged coal . . . each new use calling for new standards of lightness and toughness, new standards of quality in performance. New responsibilities—new opportunities for the Pulp and Paper Industry.

The Puseyjones Organization is now devoting itself completely to the design and construction of Paper-Making Machinery built to new high standards of speed and efficiency, and to the modernization of existing machines.

In addition to two of the largest and fastest Fourdrinier Paper-Making Machines—one for book and high-grade printing papers and one for white paper for bags—Puseyjones also have under construction a third machine of record size and speed, of Cylinder type, equipped with the latest Stream Flow Vat System for the manufacture of floor covering felt.

Puseyjones Engineers will welcome the opportunity to work with you in solving production problems.

THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
Wilmington 99, Delaware, U. S. A.

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DETROIT PUBLIC LIBRARY

Hartnagel, Nelson, Fibreboard Products, Inc., Port Angeles, Wash.; Jacoby, W. C., Crown Zellerbach Corporation, Camas, Wash.; Johnson, Victor R., St. Marys Kraft Corporation, St. Marys, Ga.; Jones, Franklin, St. Joe Paper Co., Port St. Joe, Florida; Parent, L. W., St. John Sulphite Ltd., Box 280, Fairville, St. John, N. B.; Quinn, Joseph, 24 Sycamore St., Albany, N. Y.; Sutliff, John H., A. P. W. Products Co., Inc., Albany, N. Y. (mail address Font Grove, Grove Road, Slingerlands, N. Y.); Tennent, G. R., Hummel-Ross Fibre Corp., Hopewell, Va.; Weleber, F. J., Hawley Pulp and Paper Co., Oregon City, Oregon; H. R. Wheeler, Jr., Oswego Falls Corp., Fulton, N. Y.; Wood, Edward P., Hollingsworth and Whitney Co., Mobile 7, Ala.

Commercial Laboratories

Andrews, A. B., Box 57, Lewiston, Maine; Cellulose Products Laboratory (E. D. Rich, Director), 754 Broadway, Tacoma 2, Wash.; Danneker & Evans, Inc., 309 Camp St., New Orleans, La.; Donald & Co., Ltd., J. T., 1181 Guy St., Montreal, Canada; Hamlin & Morrison, 216 South 2nd St., Philadelphia, Pa.; Knudsen, K. Hv., 331 W. Broadway, New York, N. Y.; Orthmann Laboratories, Inc., 647 W. Virginia St., Milwaukee, Wis.; Schwantes, Everett J., Gulick-Henderson Co., Inc., 431 S. Dearborn St., Chicago, Ill.; Skinner & Sherman, Inc., 246 Stuart St., Boston, Mass.; Steadman, B. K., Reynolds Metals Co., Richmond 13, Va.; U. S. Testing Co., Inc., 1415 Park Ave., Hoboken, N. J.; Wiley & Co., Inc., 904 N. Calvert St., Baltimore, Md.; Whittington, E. F., 530 West Cedar St., Kalamazoo 45, Mich.; Williams Apparatus Co., Inc., Herald Bldg., Watertown, N. Y.

◆

PAC. COAST NEWSPAPERS FACE NEWSPRINT SHORTAGE

American newspapers are facing a return to their wartime slimness as a result of an increasingly severe shortage of newsprint, according to Jack H. Smith, president of the Pacific Coast Association of Pulp and Paper Manufacturers. Publishers on the coast are being notified of reduced quotas, and, in Portland, it was indicated that the daily newspapers will be forced to return to the size prevailing in the fourth quarter of 1945. Among the factors cited in the shortage were:

1. A demand for paper in many lines which far exceeds the existing supply.

2. A shortage of labor in the woods to produce pulp logs, a factor aggravated in this area by the prolonged lumber strike, which reduced log inventories sharply.

3. Unfavorable price ceilings on newsprint as compared to other paper products, causing pulp to go into lines of greater profit.

4. Failure of expected newsprint imports from foreign countries.

Mr. Smith, who is also president of Hawley Pulp & Paper Company, said that newspapers had returned to prewar sizes too suddenly for the industry to sustain them. He indicated that the shortage is general and no relief is in sight.

At least part of the situation has arisen from the action of certain "slick paper" magazines in buying mills and converting their entire output to the glossy-finished paper needed by those publications. Production of newsprint has been correspondingly reduced. The last increase in the price of newsprint was in December, when OPA pegged the price at $67.00 a ton; other kinds of paper have had more favorable adjustments.

◆

NORTHERN PAPER MILLS TO INSTALL NEW BOILER

By January 1, 1947, a large, high-pressure boiler will be delivered to the Northern Paper Mills, Green Bay, Wisconsin, according to an announcement made this month by A. B. Hansen, president and general manager. Supplementing the two boilers now in use, the new unit should be in service within three months after delivery. The estimated cost of the addition is $300,000.

The added facility will insure continuous production, and uninterrupted employment by providing reserve boiler capacity. Under present conditions, with the boilers constantly overloaded, any boiler trouble necessitates shutting down the mill, Mr. Hansen explained. Provision was made for one-third unit when the plant was erected in 1938 in anticipation of expanded needs.

The new boiler is designed to operate at 700 pound pressure and be capable of converting 100,000 pounds of water an hour into steam. The two older units have a capacity of 75,000 pounds each. It will be installed in the present boiler house, and be connected to the same stack. Pulverized coal, such as burned by the others, will be the principal fuel.

Installation will be performed under the supervision of Sargent-Lundy, the Chicago engineering firm which supervised the erection of the original plant. The boiler is to be built by the Riley Stoker Corporation.

ALLEN ANNOUNCES NEW $12,000,000 KRAFT MILL FOR NORTHWEST FLORIDA

Plans for the construction of a $12,000,000 pulp and paper mill in Northwest Florida were announced by J. H. Allen, president of the recently formed Alabama Pulp & Paper Company, in an address April 16 before the Pensacola (Fla.) Rotary Club.

The new plant will be located about eight miles southwest of Atmore, Alabama, and will manufacture all-purpose kraft paper.

Mr. Allen is president of Florida Pulp & Paper Company, and the Santa Rosa Pulp & Paper Company, Pensacola, Florida. (The latter company is located at Cantonment, near Pensacola.) He states his firm owns more than 800,000 acres of pine timber in South Alabama and Northwest Florida, which will be used to supply the proposed new plant as well as the pulp and paper plant at nearby Cantonment. Mr. Allen states that the company has an established reforestation program which will guarantee operation of the two plants in perpetuity.

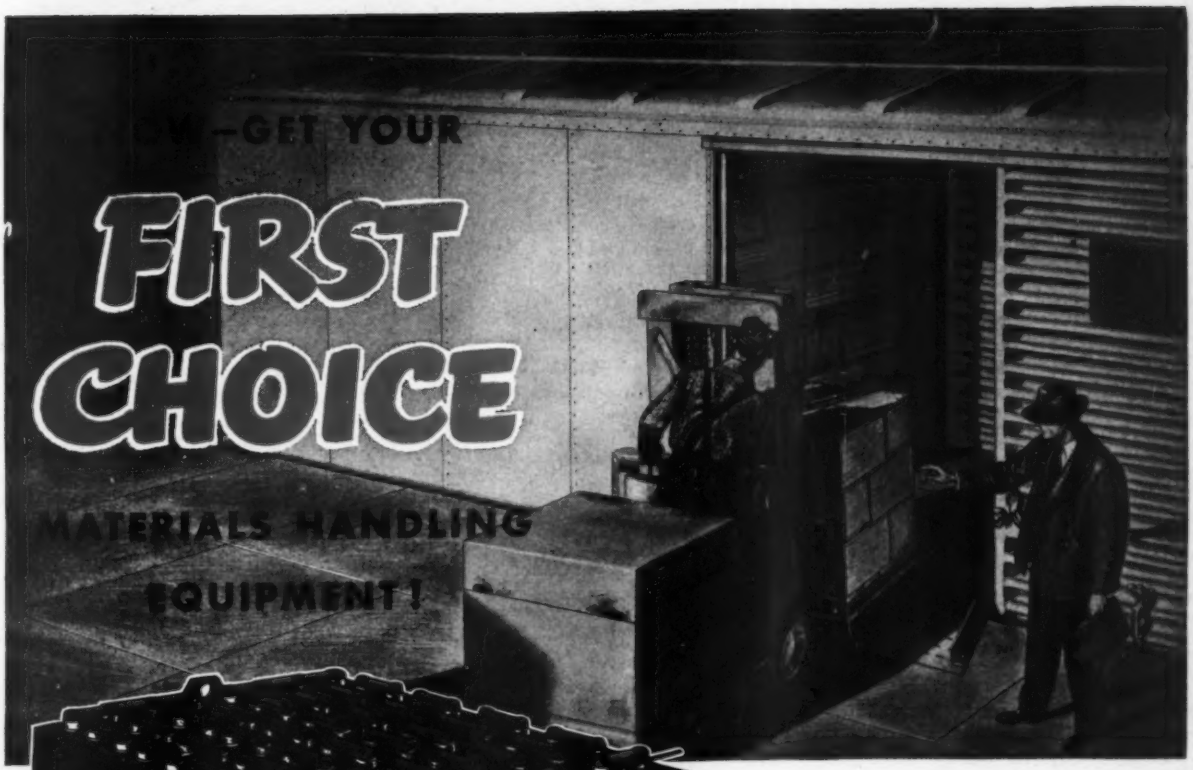
Estimating that 2,500 workers from Florida and Alabama will find employment in the new plant and in the woods cutting timber, Mr. Allen estimated the annual payroll will run upwards from $4,000,000. Engineers of the Frisco Railroad Company are now locating side-track facilities for the new plant. To provide housing for the workers, Mr. Allen stated preliminary work is now in progress on a site selected for homes.

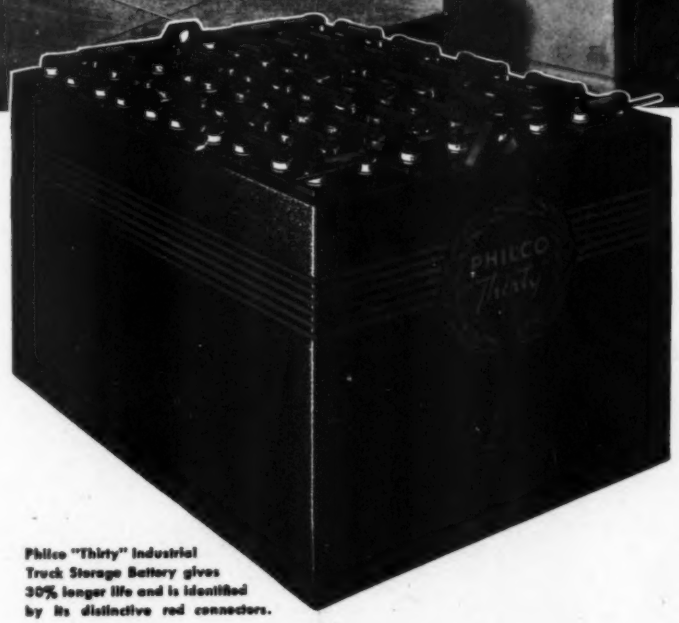
◆

PAPERMAKING CLASSES AT ST. CROIX ARE SUCCESSFUL

The early part of this year a unique plan was inaugurated at St. Croix Paper Company, Woodland, Maine. An item published in the company's newspaper, *The St. Croix Observer*, states that Floyd Coons, paper mill superintendent, has started a school for the purpose of giving instructions in paper manufacture to a group of the younger men working on the paper machines. Although the classes originally were intended for the younger papermakers, there was also a sizable group of older men in attendance. The last session was held on March 3.

The purpose of these classes was to acquaint the men with the problems that faced them when promotions were in order and to prepare them to better assume responsibilities when they arose. To the many servicemen who are back on their old jobs, it provided for job rehabilitation and information on the





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Now you can get the kind of industrial trucks experience has proved the safest, most flexible and maintenance-free—ELECTRIC TRUCKS! And you can power your trucks with the greatest materials handling development since the fork-lift truck, itself—PHILCO "THIRTY", the Storage Battery with 30% longer life! Plan now for the big demands increasing production will place on your materials handling equipment. Philco "Thirty" will give your trucks top capacity, *plus* savings in maintenance, depreciation and replacements. Write today for new catalogs giving specifications.

PHILCO CORPORATION • STORAGE BATTERY DIVISION • TRENTON 7, NEW JERSEY

PHILCO *Famous for Quality the World Over*

changes that occurred while they were away. These classes proved of inestimable value to the ex-servicemen, many of whom already have stepped up to ratings that would have come to them had they remained on the job.

Some of the more advanced subjects taken up during the classes were: Free and slow stock, paper testing, wet end operations, dryers and drying conditions, sheet finishing and reel building, rewinding operations and slicing.

George Townsend, chief chemist of St. Croix, spoke at the third session. He explained in detail the manufacture of acid and sulphite stock.

◆

MANDO ACQUIRES NAT'L POLE AND TREATING CO.

Announcement has been made by National Pole and Treating Company that, as of March 30, 1946, it has sold its operating properties, and business, to the Minnesota and Ontario Paper Company, Minneapolis, Minnesota.

The business of the company will be carried on at 500 Baker Arcade Building, Minneapolis 2, and will be known as National Pole and Treating Division, Minnesota and Ontario Paper Company. No changes in personnel or policies are contemplated.

◆

REPORTED SALE PENDING TOMAHAWK KRAFT PAPER CO. TO NAT'L CONTAINER CORP.

As this issue goes to press, a news report states that the sale of Tomahawk Kraft Paper Company, Tomahawk, Wisconsin, to the National Container Corporation, New York City, is being negotiated.

The report further states that should the sale be consummated, the purchaser intends to switch production from present paper grades to kraft board used in the manuacture of corrugated shipping containers. The container company also plans to install equipment to double the mill's capacity and build a converting plant for making corrugated containers.

◆

GARDNER-RICHARDSON BUYS STOCK OF RICHARDSON CO.

Purchase of The Gardner-Richardson Company (Middletown, Ohio) stock which had been held by The Richardson Company, Lockland, was financed by an issue of $2,500,000 debenture bonds, E. T. Gardner, Middletown, Ohio, president of Gardner-Richardson, explained March 29.

Mr. Gardner stated the company bought in its shares for retirement and financed the purchase through the debenture issue. The transaction will have no effect on personnel or operations of The Gardner-Richardson Company. Company headquarters two mills and a folding box plant are at Middletown; a board mill and box units are at Lockland.

At the annual shareholders' meeting of Gardner-Richardson on April 15, the following officers were elected:

Chairman of the Board—W. B. Turner

Vice president and general manager—E. T. Gardner

Vice president—Colin Gardner

Vice president and secretary—Robert R. Richardson

Treasurer and assistant to the president—E. T. Gardner, Jr.

Assistant treasurer—J. J. Hain

Assistant treasurer—H. O. Brosius

Assistant secretary—R. B. Gardner

◆

95% OF K-C VETERANS HAVE GONE BACK TO WORK

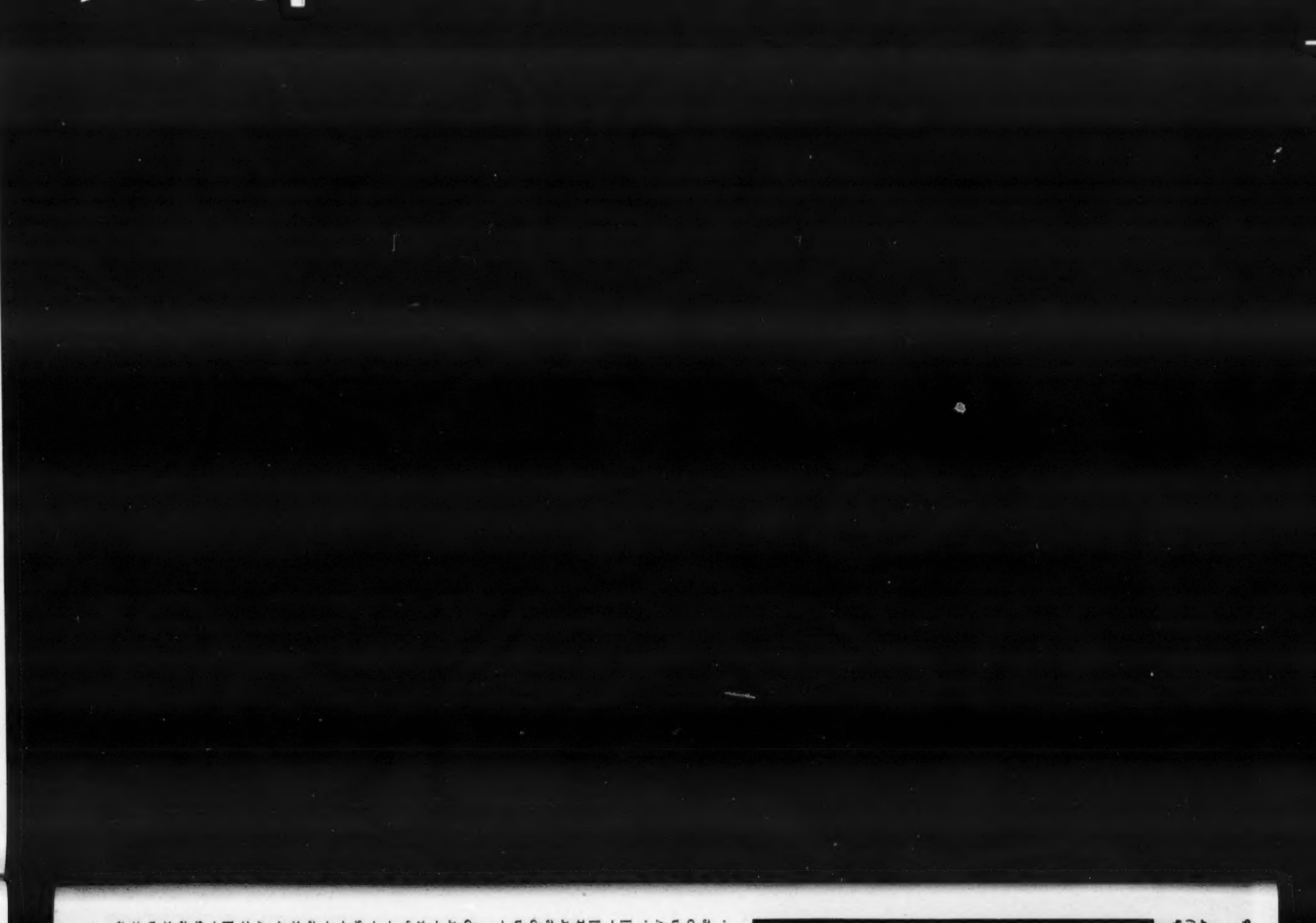
Just how returning veterans are refitting themselves into the work-a-day world of civilian life found one substantial answer in a report made recently by the Kimberly-Clark Corporation, Neenah, Wisconsin. The veterans are going back to work, at their prewar jobs and—according to all mill management reports—with very few indications that they have ever been away from the company for the long years required to win a world-wide war.

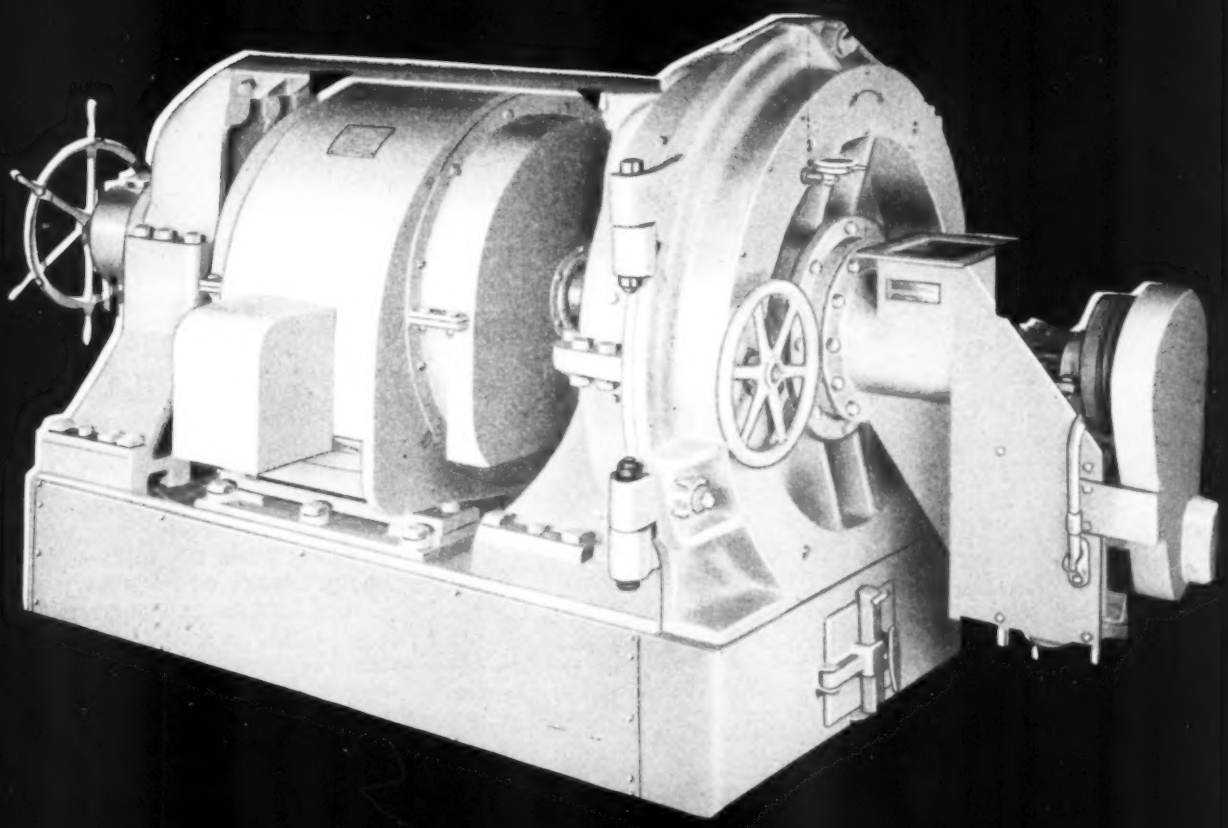
Above all, the veteran has gone back to work. That was the highlight of Kimberly-Clark's report, drawn from all mills, which showed that ninety-three in every one hundred have come back to the Corporation. This rate of return is based on statistics covering approximately 1,300 persons and is understood to be by far the highest such return yet announced by any large-scale employer in the country.

Timing of the survey was such that military discharges had reached the half-way mark, so far as Kimberly-Clark servicemen were concerned. Approximately 2,600 of the corporation's men and women have gone into service. (An additional 300 veterans, beyond the 1,300 mentioned heretofore, are now a part of the company but new to the corporation and consequently not tabulated as a basis for this determination. Most of this group are at work for the first time.)

Not all veterans tallied in the 93-back-out-of-100 class are at work. An average of three for each such group has elected to go to school but, since corporation policy is to allow one year during which they may do so without loss of job rights, these men are still considered as having a company connection. This factor does reduce total actually on payroll to ninety per cent. Extension of job rights is provided by Kimberly-Clark so that the veteran may determine whether he wants to continue with school, after twelve months of it, or come back to work.

Kimberly-Clark's "Thousandth Veteran," Martin Wildenberg (right), is shown with Robert Laut, veteran co-ordinator. Four brothers (two of them veterans themselves) were at K-C to welcome him after approximately four years in the service. Their father has been retired





SETTING THE PACE

A relative newcomer . . . the new, improved Sprout-Waldron 36-2 Refiner has proved outstandingly efficient and economical in the pulp and paper field.

Capable of all operations from a straight defiberizing program to the actual refining of already processed fibers for fine papers, the Sprout-Waldron 36-2 Refiner is particularly well adapted to the following applications:

1. Reducing semi-chemical pulp chips in stage operation to finely divided fibrous form.
2. Reducing groundwood rejections.
3. Reducing sulphite and kraft knots and tailings.
4. Processing kraft pulp on cycle for condenser papers.
5. Processing flax pulp on cycle for cigarette papers.
6. Processing sulphite pulp on cycle for glassine and waxing papers.

SPROUT-WALDRON & CO.

Manufacturing Engineers

MUNCY PENNSYLVANIA

A last measurement in the survey helped to discover the direction pursued by veterans who have not returned. "Going into business for myself" topped the list, but with important variations in that most of this group are doing so by following in their father's business or through the purchase of a "going" small business owned and operated by a relative ready for retirement; five veterans are launching new businesses in these categories: Photography, garage operation, wholesale tobacco distributor, insurance and farming. Other reasons on the list for non-return were: (a) jobs elsewhere, and (b) women employees married in service and now living in the husbands' community.

◆

WORK ON NEW PLANT AT MENASHA IS PROGRESSING

Construction is proceeding on Marathon Corporation's new carton and folding box plant at Menasha, Wisconsin. As mentioned in the first announcement (Cf. P.I. and P.W., Jan., 1946), the new structure will be composed of six units. A building permit for four units of the building has been issued by the city of Menasha and the building plans have been approved by the State Industrial Commission.

The new structure will provide ample manufacturing space for increased production of the company's line of quality food packages. Warehousing facilities and easy access to rail connections also will be provided by the new unit.

◆

WASHINGTON

A tight situation in casein is troubling Government officials and paper mills using this material for coating. A large portion of the domestic supply is secured from Argentina, but ceiling prices have discouraged Argentina from shipping in the usual quantities. A shortage of starch, used as a substitute, further complicates the situation.

Some price ceiling adjustments have been made by OPA. Southern pulpwood ceilings have been lifted $1.40 per cord. Binders board ceilings have been upped $6 per ton, and an adjustment made in writing paper ceilings by which the price in sheets has been raised, but that in jumbo rolls decreased.

The Federal Trade Commission has dismissed its price fixing complaint against the Waxed Paper Association and its members.

The Office of Price Administration has filed a triple-damage suit for $270,000 against the Resolute Paper Board Company and the Resolute Paper Products Company, of New York, charged with an 18 per cent overcharge on baking boxes to New York buyers.

◆

OPA INCREASES WOOD PULP CEILINGS ABOUT 10%

Effective April 22, the OPA increased producers' price ceilings for wood pulp as follows:

Standard Paper Grades	Per ton Increase
Sulphite, bleached and unbleached Soda pulp Northern bleached sulphate Groundwood	$8.00
Southern bleached sulphate	9.00
Northern unbleached sulphate	3.00
Southern unbleached sulphate	6.00

with proportionate increases for certain special grades.

Maximum freight rate to be absorbed by seller will be reduced to $1.00 for all domestic and Western Canadian producers; $2.00 for Eastern Canadian producers, and $3.00 for overseas producers.

◆

FINAL SUPPLEMENT OF VESTED CHEM. PATENTS MAY NOW BE PROCURED

The Office of Alien Property Custodian, Washington, D. C., announces that the second final supplement to the abstracts of vested chemical patents, containing abstracts of about 800 patents and patent applications vested since publication of the first supplement in 1945, is now available.

The abstracts, grouped into thirty-one fields, range from heavy chemicals, drugs, foods, unit processes and ceramics, to plastics, pulp and paper, rubber and petroleum. These supplements may be purchased from the Office of Alien Property Custodian, Chicago 3, Illinois, for $1.00 each, and the set of original abstracts, covering about 8,000 patents in the chemical field, is priced at $25.00.

◆

BLISTER RUST PROTECTION DEVELOPING IN WISCONSIN

An annual report issued by T. F. Kouba, in charge of blister rust control work in the state of Wisconsin, reveals that approximately 315,400 acres of white pine stands in the state have been given protection against blister rust by removing currant and gooseberry bushes. Approximately 62,250 acres have been placed on maintenance. The State also has an additional 400,000 acres of white pine where the stand at present is not sufficient to warrant the cost of control work. A state map showing the prevalence of currant and gooseberry bushes (ribes) has just been published by the white pine blister rust control section of the state agricultural department.

Mr. Kouba reports that the value of white pine stands is estimated at nearly $37,000,000. Due to an abnormal demand for pine lumber, there has been a decided increase in white pine logging. Reproduction has more than kept pace with the cuttings.

White pine blister rust control work is carried out by the Wisconsin and U. S. Departments of Agriculture in co-operation with the Wisconsin Conservation Department and other federal, state and private agencies.

◆

LONGVIEW FIBRE CO. BUYS LARGE TRACT OF TIMBER—SECOND AND OLD GROWTH

The purchase of a large tract of second growth and old growth timber is announced by Longview Fibre Company, of Longview, Washington. The property acquired consists of more than 1,700 acres of timber and includes a fine home built in 1933 by Mr. and Mrs. Charles A. Moore, from whom the property was purchased. The Moores will turn over the property to the Longview company by August. According to R. S. Wertheimer, vice president and resident manager of the Longview company, the purchase of this property is part of a general acquisition program of the company to provide sources of pulp timber.

◆

GAIR SUBSIDIARY WILL BUILD PLANT AT SAVANNAH

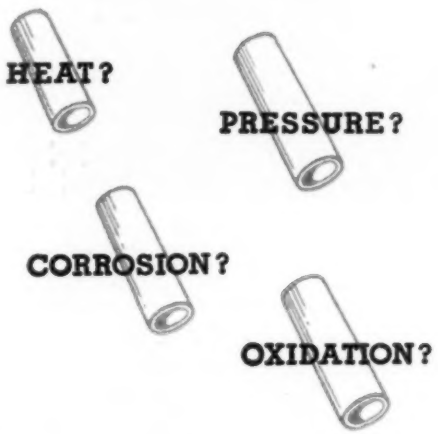
A new sulphate pulp and paperboard mill will be erected soon by Southern Paperboard Corporation (subsidiary of Robert Gair Company, Inc.) on a 180 acre tract of land at Port Wentworth, on the Savannah River near Savannah, Georgia.

Fort Wayne Corrugated Paper Company has a substantial interest in Southern Paperboard Corporation, and that company, together with the Robert Gair Company, Inc., have invested $12,000,000 in the project, of which approximately $9,000,000 will be used for the mill and equipment.

The mill will have a daily capacity of 450 tons, or about 135,000 tons of container board per year, all of which will be converted into shipping containers at the fabricating plants of the two companies in the north.

The wood and land operations incident to logging the mill will be carried on by Gair Woodlands Corpo-

What is Your Toughest Problem in Tubing?



Chances are, your answer lies in one of the Timken High Temperature Steels listed at the right. Our metallurgists, trained in high temperature applications, will investigate and recommend the analysis best suited to your particular requirements.

No other steel producer has such a background of research, knowledge and experience of high temperature applications. No other steel producer offers such a wide choice of steels for specific high temperature problems. And no other can give such assurance of uniform quality. For the production of Timken Steels for High Temperature Service is performed within this one organization through every step of every operation, from melting the steel to finishing the tubing.

Get our recommendations for solution of your toughest problems.

Write Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio, for Technical Bulletin No. 20, "A Guide for Users of High Temperature Steels."

TIMKEN CARBON STEEL TUBING Generally used for service at temperatures not exceeding 900°F. where corrosion and oxidation resistance are not important.

TIMKEN CARBON-MO STEEL TUBING For temperatures up to 1000°F. the improved creep strength allows for greater safety than can be obtained from carbon steel.

TIMKEN DM STEEL TUBING For service up to 1150°F. this steel offers outstanding creep strength.

TIMKEN 2% CR 1/2% MO STEEL TUBING For service up to 1150°F. where intermediate corrosion resistance is desired in combination with good creep strength and fair oxidation resistance.

TIMKEN SICROMO 2 STEEL TUBING For service up to 1200°F. where better scale resistance is required than can be obtained with 2% Cr. ½% Mo. steel.

TIMKEN 2-1/4% CR-1.0% MO STEEL TUBING For service up to 1150°F. where a greater resistance to creep is desired than that possessed by the 2% Cr. ½% Mo. steel.

TIMKEN SICROMO 3 STEEL TUBING For service up to 1200°F. the excellent oxidation and good corrosion resistance of this material justifies its choice as a substitute for 4-6% Cr. ½% Mo. steel.

TIMKEN 4-6% CR-MO STEEL TUBING For service up to 1200°F. where corrosion resistance is a primary requirement. Corrosion resistance somewhat superior, but oxidation resistance less than Sicromo 3.

TIMKEN SICROMO 5 S STEEL TUBING For oxidation resistance up to 1500°F. Good creep strength, corrosion resistance and structural stability up to 1300°F.

TIMKEN SICROMO 7 STEEL TUBING For those applications where better corrosion resistance is required than can be obtained with the 5.0 per cent Chromium type steels.

TIMKEN SICROMO 9 M STEEL TUBING This steel possesses the maximum corrosion resistance of any of the steels below the stainless group.

TIMKEN 18-8 STEEL TUBING This austenitic, non-magnetic alloy shows the best combination of creep strength, all corrosion resistance and oxidation resistance for service up to 1500°F.

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TRADE-MARK REG. U. S. PAT. OFF.
Fine Alloy
STEEL AND SEAMLESS TUBES

★ YEARS AHEAD — THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS in hot rolled and cold finished Alloy Steel Bars for forging and machining applications as well as a complete range of Stainless, Graphitic and Standard Tool Steel analyses. Also Alloy and Stainless Seamless Steel Tubing for mechanical and pressure tube applications.

ration, a wholly owned Southern Paperboard Corporation subsidiary with a paid in capital of $2,000,000. T. W. Earle, with the Gair organization for the past year acquiring woodlands, is president of the new Gair Woodlands Corporation.

◆

FORESTRY AWARDS HAVE BEEN ESTABLISHED BY UNION BAG

Two forestry scholarships at the George Foster Peabody School of Forestry of the University of Georgia, and two forestry fellowships at the School of Forestry, Duke University, recently were established by the Union Bag & Paper Corporation.

D. J. Hardenbrook, vice president of the corporation in charge of woodlands operations, states the purpose of the awards is to stimulate the interest of young men in forestry problems of private owners, and to assist in the education of qualified forestry students. This is in keeping with the company's policy of encouraging improved management of timber lands for successive harvests of southern pine. Both awards will be effective with the opening of the 1946 fall terms.

The two four-year scholarships, to be known as Union Bag & Paper Corporation Forestry Scholarships, will be awarded each year to high school graduates of Georgia for study in the School of Forestry leading to a degree of Bachelor of Science in Forestry.

The two fellowships, the Union Bag & Paper Corporation Forestry Fellowships, will be awarded each year to foresty graduates, or others who are qualified for studies leading to higher degrees in Forestry at Duke University. Preference will be given qualified applicants from southern forestry schools for one of the awards.

◆

BRITISH PAPER TRADE
V-E Day Plus 365

It may appear to be an extraordinary statement, but the British Paper Trade is in a more difficult position today than it was a year ago when the war in Europe ended.

There are many contributory reasons for this position, one of which was concisely stated by a mill manager a few days ago when in conversation he remarked that if his mill could double its production immediately it would be incapable of meeting demand. Yet this mill is already producing a good percentage of its prewar total. In this remark we have a clear insight into the current position of paper supply and demand. In effect, the call for paper is so heavy that if all the paper mills doubled present production it is doubtful if demand could be satisfied.

At presentation of Union Bag & Paper Corporation fellowships and scholarships in forestry are: Left to right—Dean Clarence F. Korstian, School of Forestry, Duke University; J. J. Armstrong, general manager, Woodlands Division, Union Bag & Paper; Dean Donald J. Weddell, School of Forestry, Duke University; and Donald J. Hardenbrook, vice president of Union Bag in charge of woodlands operations

The progress made in increasing paper production since the end of the war in Europe has been so gradual that its effect has been hardly perceptible. But the fact remains there has been an appreciable improvement since May, 1945. Coupled with this, demands by the various government departments have fallen sharply, thus releasing more paper for general consumption.

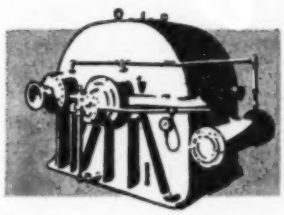
As is well known, paper production at all mills is controlled by three main items: materials, manpower, and coal. Taking the present coal position first, in prewar days mills were able to receive a constant supply of coal of a fairly regular standard, and being used to this one quality, they could estimate the power obtainable with a degree of constancy. But the coal being supplied at present to the British mills is inferior to the prewar qualities, not consistent, and there is the ever-present fear that supplies may cease suddenly owing to the present state of the coal mining industry mainly brought about by the fact that there is no incentive for any workman to labor beyond a certain point, for, after that, such a large proportion of his earnings is deducted for income tax that the financial benefit is practically worthless.

Manpower is gradually returning to the paper mills, as in every other industry, but this movement is not fast enough or in the right order to make an immediate impression. In many cases, key men, who were obviously held as long as possible and were the last to be released for the forces, are naturally, under the present demobilization scheme, still retained. Then again many women workers who were so useful at the mills, particularly in the Salle, left the mills during the war for the more important job of making munitions or serving with the women's forces. Many of these women have not yet returned; some never will; consequently, serious delays in the final stages of papermaking and despatching are being experienced by the mills. The bottleneck in the Salle is serious causing many of the mills to favor orders in reels in preference to sheets.

Finally, the subject of materials figures largely in present-day difficulties. Instead of, as in the old days, mills purchasing sufficient supplies of wood pulp from Scandinavia to cover requirements for many months ahead and the esparto mills receiving constant supplies of grass from Africa these materials now have to be bought through the Paper Control. Over and above this all classes of mills have to take substitute materials of one kind or another. Thus nearly every mill is required to include a percentage of

Improved STANOILS

...last longer in gear cases



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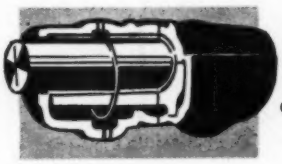
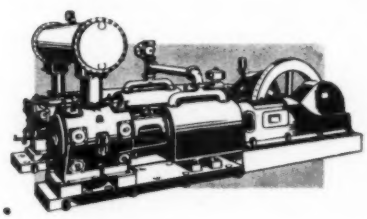


...in compressors



...and hydraulic systems

STANOILS have long been outstanding for relative freedom from deposit formation, and for their long lasting quality in all types of service. Now by the addition of an oxidation inhibitor, developed by Standard Oil, the oxidation stability of Stanoils has been improved many-fold.

With improved Stanoils, oil acidity will remain at a safe low figure for long periods of operation. At the same time, deposit formation is practically eliminated. In addition, an effective defoaming agent is used.

These advantages can be secured for a variety of applications, because improved Stanoils are available in a wide range of viscosity grades. In fact, you may find that Stanoils can be applied to all your lubricating jobs, with consequent simplification of ordering and stocking.

A Standard Oil Lubrication Engineer will be glad to help you test improved Stanoil and point out equipment in your plant in which the high stability and clean operation of Stanoil can save maintenance time and money. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, for the Engineer nearest you.

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

wastepaper in its furnish. Esparto mills have to rely upon straw as their chief material.

Other substitutes, such as home grown timber (which is not very suitable for papermaking) wood waste, sawdust, etc., are introduced into the various kinds of papers and these substitutes tend to slow up production, consequently, in the aggregate, a considerable quantity of paper which could be produced if the correct materials were available in their prewar proportions, is not being made.

Wastepaper, for example, has to go through a process of de-inking which tends to further weaken these "second hand" fibers. This would not matter much if this waste was being used for boards only but it has to be introduced into the "better class" papers. Other substitutes present their own problems of processing all of which means time and labor. Again, it is particularly unfortunate that the esparto mills, which, in prewar days, were responsible for producing a wide range of fine quality book papers and other qualities particularly suitable for multicolored printing, are forced to substitute straw for esparto grass. While these mills are admittedly making an excellent job with straw, the resultant papers lack that fineness of handle and kindly and resilient nature of the old esparto papers. What is more important, in the present need for more paper, the yield of pulp from straw is only about 60 per cent of that from esparto grass. Therefore, to produce the same quantity of paper these mills have to extend the time taken in boiling, or, conversely, a smaller amount of paper is being produced in the equivalent time needed with esparto grass. Added to this a greater amount of coal is being used which today is a matter of national importance. Among the products for which these mills became famous were their coated papers. The esparto body coated paper, as well as all other coated papers, are at a premium and many more hundreds of tons are urgently required.

There is another disquieting factor in the materials situation. Our imports of wood pulp for the present year do not appear to be any more promising than they were last year owing to the lack of coal in Sweden.

These are the main troubles of the mills, but added to this is the fact that very little of the machinery has been seriously overhauled during the past seven years during which time it has been pressed to turn out every possible sheet. Much of the labor at the mills is unskilled, many of the men are war weary and are longing for the day when they return to three shifts of eight hours instead of the war measure of two shifts of twelve hours. A further factor, which it is useless to try and disguise, is the minimum and the lack of variety of food and, as mentioned above, the total lack of incentive to earn more money which is taken away by the Government.

While on the making side there are those drags on production on the purchasing side the reverse is happening. As more men return from the forces they are re-entering old established printing businesses or setting up on their own account. Consequently, more people are calling for paper, and although supplies have improved these supplies have to be spread over a far greater surface. There is little doubt that those printers and other paper consumers who have been in business all through the war are finding it more difficult to obtain paper today than during the war years. Coupled with this, as each license period arrives the different sections of the trade: publishers, manufacturing stationers, bag makers, etc., are being granted slightly higher quotas; consequently, the little extra paper made each period is rapidly consumed. The greater part of it is sold long before it reaches the machine; in fact, it is admitted on all sides that the present license period (March to June) is the worst yet experienced. Production of many of the mills was entirely sold out within the first week of the period.

Finally, another factor which is helping to swell the volume of trade is the lifting of the No. 48 order. By this means stationery was allowed once again in the quarto size; the production of greetings cards was again permitted, and paper, in small quantities, is being granted for new periodicals not published before the war. Taking the long view and considering prevailing conditions we venture to predict that although more paper should be produced during each license period paper supplies will continue in their present position with only slight signs of improvement during the present year. *It is also extremely doubtful whether supplies will meet demand before* 1948.

◆

NEW COMPANY ORGANIZED TO BUILD $10,000,000 NEWSPRINT MILL IN ALA.

The incorporation of a company which plans the construction of a newsprint plant at Childersburg, Alabama, was announced on March 23. The new company, the Coosa River Newsprint Company, seeks to acquire part of the Alabama Ordnance Works as a site for the proposed mill, and if that plan is consummated, some of the ordnance facilities may also be used.

The estimated cost of the plant is $10,000,000. The officers of the company are: Donald Comer, chairman of the board, Avondale Mills, who holds the same post in the new organization; J. W. Brown, Jr., of Sylacauga, Alabama, president; and E. L. Widemore, Sylacauga, vice president. The directors are: Donald Comer; Thomas W. Martin, president of Alabama Power Company; Clarence B. Hanson, Jr., publisher of the Birmingham *News* and *Age-Herald;* Walter Bouldin, Birmingham attorney, and J. W. Brown, who is president of the first National Bank of Sylacauga.

Mr. Comer states the new company is an outgrowth of the Talladega County War Plans Conversion Committee, formed near the end of the war to develop peacetime uses for government-owned war plants in that area. The Alabama Ordnance Works was the largest ordnance manufacturing plant in the Southeast. It manufactured smokeless powder and explosives.

◆

PLAN FOR ARTIFICIAL RESERVOIR IN WISCONSIN

Plans have been announced for the largest artificial reservoir in Wisconsin, a 31,600 acre man-made lake adjoining the Wisconsin River about 25 miles south of Wausau.

The announcement was made by officials of the Wisconsin Valley Improvement Company, the stock of which is owned by paper mills and electric companies located along the Wisconsin River.

Water for the reservoir will be pumped from the river by four coaxial pumps with a capacity of 2,225,000 gallons per minute, this being made necessary by the fact that the reservoir will be 25 feet above the river level. It was said that completion of the project will enable electric plants to generate as much additional electricity on the Wisconsin River alone as is now generated by all the waterpower plants in the state for an average month.

To be known as the George Mead reservoir, in honor of George Mead, president of the company and president of the Consolidated Water Power & Paper Company, the $2,500,000 project will be started as soon as it is approved by the Wisconsin Public Service Commission and as rapidly as the necessary materials and flowage lands still needed can be purchased. About 22,500 acres of flowage land has been acquired since 1928, and negotiations are in progress for the additional land needed.

50 Ton Load!...Operator is SAFE with Orton

COMPRESSION BRAKING

All Orton Diesel Cranes are equipped with a 3-speed *and reverse* transmission, located just behind the engine to control the speeds of *all* operations of the crane. When lowering a *heavy load*, the transmission is put in reverse and the load is lowered against compression of the engine exactly as you brake your car going down hill in second gear.

Just as in your car, the compression of the engine keeps the load from running away, with no possibility of dropping it. Fine control is secured with the friction brake, *which gives fine control only*, and is not relied upon for the safe holding of the load.

LOAD IS LOWERED AGAINST COMPRESSION OF ENGINE EXACTLY AS YOU BRAKE YOUR CAR GOING DOWN HILL IN SECOND GEAR

Compression braking is the Orton invention which made the Diesel crane *practical* for handling heavy loads. *Send for Orton Catalog No. 77 giving detailed description.*

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Between 500 and 600 men will be employed on the project. The reservoir will be 20 miles long, 9½ miles wide and 25 feet deep. Storage capacity will be 18,730,000,000 cu. ft.

◆

SWEDISH PULP IMPORTS DOWN

The present shortage of paper for consumer demand continues, owing to the reduced shipments of Swedish pulp. The output of domestic mills, it is emphasized by industry leaders, is insufficient to meet present demands, and improvements are contemplated by many companies to fill the growing market. At the fortieth anniversary luncheon of the Swedish Chamber of Commerce in New York, March 26, Lennart Nylander, Swedish Consul General at New York, said that after six months of negotiations between Swedish officials and the Office of Price Administration, he was hopeful that price increases of from $4 to $12 a ton, depending on grade, on imported pulp would be granted. Since the end of the European war, Sweden, he said, has shipped 850,000 tons of pulp to the American market at prices lower than could have been obtained elsewhere. Unless the price increase is granted he intimated that shipments of Swedish pulp might drop to a total of only 100,000 to 140,000 tons between now and the end of the year.

◆

GREASEPROOF PAPER MARKET IN MEXICO IS EXCELLENT

American greaseproof paper faces excellent market prospects in Mexico, according to a report by Henry E. Allen, United States Embassy, Mexico City.

Certain paper manufacturing facilities are expanding in Mexico; however, that country will depend on imports for the more specialized papers for a number of years to come. This information is released by the U. S. Department of Commerce.

The production of greaseproof papers in Mexico amounted to 703 short tons in 1942, while imports for the same year were estimated at 1,381 short tons. No exports have been reported.

Improved standard of living resulting from Mexico's expanding industrial program is expected to open up new markets for improved packaging and handling of merchandise which should offer opportunities for increased use of greaseproof papers. Several distributors of paper and paper products in Mexico already have received offers of immediate delivery on certain types of specialized papers from various European manufacturers, according to the Department of Commerce.

Briefs . . .

▶▶▶ A GROUP OF PRINTERS from Wichita, Kansas, visited the Hutchinson (Kansas) paper mill of the Central Fiber Products Company on April 4 as guests of the mill management. Forty representatives of Wichita printing firms participated in tour of the paper mill following the luncheon given by the paper company. The printing industry of Wichita announces plans for a graphic arts exhibition to be held during this year. The show will be designed to educate residents of Wichita and Kansas as to the growing importance of printing in their state.

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▶▶▶ A NEW PAPER BAG plant is being erected at Vancouver (B.C.) by the St. Regis Paper Company, to cost approximately $320.00. The plant which the company has been operating was the Vancouver branch of the Bates Valve Bag Company which St. Regis purchased in 1929, and they had planned to build a new plant for some time.

◆

▶▶▶ A LABORATORY addition, a women's rest room off the finishing room, and the raising of one section of the mill roof are part of a modernizing project at the Bergstrom Paper Company, Neenah, Wisconsin. Estimated cost of the work is $35,000 which includes remodeling of the interior of the mill, as well as replacement of obsolete equipment. Now in progress, reconstruction work on the turbine plant, damaged in the explosion last year, will be completed soon.

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▶▶▶ FROM ITS EXTENSIVE million-dollar logging development in Clackamas County, Oregon, the Weyerhaeuser Timber Company is supplying logs to its pulp mill at Longview, Washington. Logs are dumped in the Willamette River near Canby, Oregon, from which point they are rafted and towed down to the Columbia River and thence to Longview. A sustained yield system will yield about 10 million feet, although the operation is geared to produce 35 million feet of logs annually.

◆

▶▶▶ ONCE EACH YEAR since 1935, the Chamber of Commerce of the United States has sponsored "National Foreign Trade Week." May 19-25 will be observed for 1946 Week and the theme will be "World Trade Puts Men to Work." Trade Agreements are to be negotiated by the United States with at least fourteen countries under extension of the Trade Agreement Act; an International Conference on Trade and Employment will be held later in the year; and Congress will consider legislation affecting our commercial relations with the rest of the world.

◆

▶▶▶ THE ALCOHOL RECOVERY plant at the Puget Sound Pulp and Timber Company, Bellingham, Washington, is now producing some 6,000 gallons of alcohol daily from waste liquors. This statement was given by L. P. Turcotte, vice president of the company, to newsmen during a recent tour of the plant. The alcohol recovery plant started about a year ago (Cf. P.I. and P.W. March, 1945).

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▶▶▶ REPRESENTATIVES of the Indian Supply Mission to Washington have recently discussed the problem of newsprint supply for India with Canadian newsprint manufacturers and other authorities concerned. Preliminary discussions have been carried on in Ottawa, Montreal and Quebec City, and are to be followed later by a visit from Devadas K. Gandhi, son of Mohandas K. Gandhi, and managing editor of the *Daily Hindustan Times*, who is coming to America in an effort to help Indian newspapers replenish their newsprint supplies.

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▶▶▶ THE PORT ROYAL Pulp and Paper Company of St. John (N. B.) has been reported sold to the K. C. Irving interests. There will be no interruption in operations, and for the present A. J. Lacroix, who is vice president and general manager of the company, will be in charge. The mill has a capacity of 125 tons of bleached sulphite pulp per day.

◆

▶▶▶ MODERNIZATION of its pulp and paper plant at Hoquiam, Washington, including new equipment to replace the old, has been announced by Rayonier, Inc. The cost will approximate $1,000,000.

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▶▶▶ THE NEW ADDITION under construction at the Neenah Paper Company, Neenah, Wisconsin, is nearing completion, and it is expected to be ready for occupancy July 1. As soon as the high water season has passed, work will be started on the tunnel which will be built underneath the railroad trestle and which will connect the new addition with the office.

A recent order from a Prominent Pulp and Paper Manufacturer

comprises the following

GENERAL AMERICAN EQUIPMENT

DIGESTERS and BLOW TANKS

COMPLETE RECAUSTICIZING PLANT

LIME RE-BURNING KILN INSTALLATION

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12 Mills Report on

A-C INSPECTION TOUR REVEALS GAINS IN PRODUCT QUALITY... OTHER SAVINGS THROUGH STREAMBARKER HYDRAULIC BARKING

IF YOU'VE SEEN Streambarker in operation, you *know* the important benefits — in *reduced* wood loss and operations, in *higher-grade* pulp — it makes possible.

But if you *haven't* seen it, the experience of 12 mills below will give you a clear, *unbiased* picture of what Streambarker is actually doing today — under widely varying mill conditions.

Compare sizes, lengths, species of wood it is handling. Check operating schedules; water pressures. Note particularly capacities it gives. *And for a positive check on what it can do in your mill,* send for quick, simple-to-calculate form contained in "Streambarker Economics" bulletin B6391. Contact your nearby A-C office, or write direct to ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2017

MILLS	Species of Wood Barked	Size of Logs Barked	Streambarker Schedule		Water Pressure	
			Hours per Day	Days per Week	Summer	Winter
MILL A	Spruce, Fir and Hemlock	4 to 18" diam., 4 ft. long	16 to 24	6 to 6½	750 lbs.	750 lbs.
MILL B	Spruce, Fir and Poplar	4 to 18" diam., 4 ft. long	9	6	670 lbs.	670 lbs.
MILL C	Spruce and Hardwood	4 to 20" diam., 4 ft. long	24—auxiliary to drums	6 to 6½	650 lbs.	650 lbs.
MILL D	Spruce	4 to 18" diam., 4 ft. long	9 to 12	6	730 lbs.	730 lbs.
MILL E	Balsam, Hemlock, Spruce, etc.	4 to 20" diam., 4 ft. long	16	6	670 lbs.	770 lbs.
MILL F	Spruce and Fir	3 to 18" diam., 4 ft. long	Auxiliary to drums	6	750 lbs.	750 lbs.
MILL G	Spruce and Fir	3 to 18" diam., 4 ft. long	24	6⅔	780 lbs.	780 lbs.
MILL H	Birch, Maple, Beech	4 to 18" diam., 4 ft. long	17	6½	635 lbs.	635 lbs.
MILL I	Poplar and Spruce	4 to 20" diam., 4 ft. long	16	6⅔	750 lbs.	750 lbs.
MILL J	Spruce, Fir, Pine, Hemlock	4 to 20" diam., 4 ft. long	24	7	650 lbs.	750 lbs.
MILL K	Pine, Birch, Poplar, etc.	3 to 20" diam., 4 ft. long	8	6	675 lbs.	675 lbs.
MILL L	Spruce	3 to 20" diam., 8 ft. long	16	6	675 lbs.	675 lbs.

ALLIS A-C CHALMERS

One of the Big 3 in Electric Power Equipment—
Biggest of All in Range of Industrial Products

A-C Streambarker!

Compare Streambarker With Other Types of Barking Equipment...

See how this revolutionary new method of hydraulic barking gives you *bigger* production — *bigger* savings — a *higher grade* of pulp than with other methods!

Depending on condition of bark, season in which cut, etc., typical mills are now getting from 8 to 14 cords per hour — with *no* brooming — sticks barked *clean* — with *no* dirt and *no* surface rot!

No. of Men, Convey., Barker, Inspec.	Streambarker Capacity Cords per Hour		Process in which Streambarked Wood is Used	Method of Bark Disposal	Miscellaneous Notes and Mill Comments
	Summer	Winter			
4	9	6	50% Sulphite 50% Groundwood	100% to Boiler	Installing hot pond for winter barking. Expect to improve operation.
3	10	8	100% Groundwood	100% to Boiler	"All steam generated by wood waste and bark," say Mill Officials.
4			Bleached Sulphite	Bark to Dump	Streambarker used on wood which other barking equipment cannot handle.
4	13	8½	88% Sulphite 12% Groundwood	100% to Boiler	"Pulp quality raised materially," say Mill Officials.
3 to 4	9½		60% Sulphite 40% Groundwood	Bark to Incinerator	Booster pump for winter barking has recently been installed.
3			Groundwood, Unbleached Sulphite	100% to Boiler	Streambarker barks wood which other barkers cannot efficiently handle.
4	9	7	100% Sulphite	100% to Boiler	Streambarker is first full-scale barker this mill has installed.
7 incl. unload, loading	9	7½	100% Soda	Bark to Dump	One of 1st Streambarker installations—yet low maintenance right along.
4	10	7	100% Sulphite	100% to Boiler	"We've eliminated knot boring, hand-cleaning, etc.," state Officials.
3	9½	6½	50% Sulphite 50% Groundwood	⅔ to Boiler, ⅓ to Dump	Streambarker cleans logs that cannot be cleaned by other barkers.
5	10	6½	100% Soda	100% to Incinerator	"Barker operation and capacity both very good," say Mill Officials.
4	10	9½	50% Sulphite 50% Groundwood	100% to Boiler	Booster pump being installed to raise pressure to 775 pounds.

PREPARATION—Hydraulic Barkers, Chip Screens, Saws, Slashers, Grinders.

COOKING—Digesters, Blow Tanks, Kilns, Heat Exchangers, Condensers.

WET ROOM — Vibrating Screens for use as Thickeners, dewatering rejects, etc.

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POWER — all types of Power Generation, Distribution and Control.

MOTORS and control — all types a-c and d-c, 1 to 7000 hp — Gearmotors.

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High Speed Machines . . . newsprint, tissue, general purpose . . . Wet Machines, Selective Drives and Hypoid Corners, Grinders, Pressure Filters, Bertrams Shakes, Removable Fourdriniers, Flow Control Units, Neilson Slices, Packer Screens, Calenders, Winders, Reels . . . what will you need in your expansion and replacement plans? They're all described in this new brochure, with illustrations, engineers' tracings and down-to-earth detailed information.

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We Have the Right Babbitt for Any Need

The success of N-B-M Babbitt Metals is based upon three important factors:

1. Virgin metals, to insure stability and uniformity.
2. Proper proportioning, to provide adequate physical properties for specific service requirements.
3. Expertly controlled preparation; the art of blending requires precise knowledge and constant control.

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Swenson Surface Condensers installed on an L.T.V. Evaporator.

Many Swenson sextuple-effect installations incorporate a newly developed Multiple Pass heating element in the first evaporator body. It improves heating surface proportioning, reduces space requirements, and contributes to lower processing costs.

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- Black Liquor Evaporators
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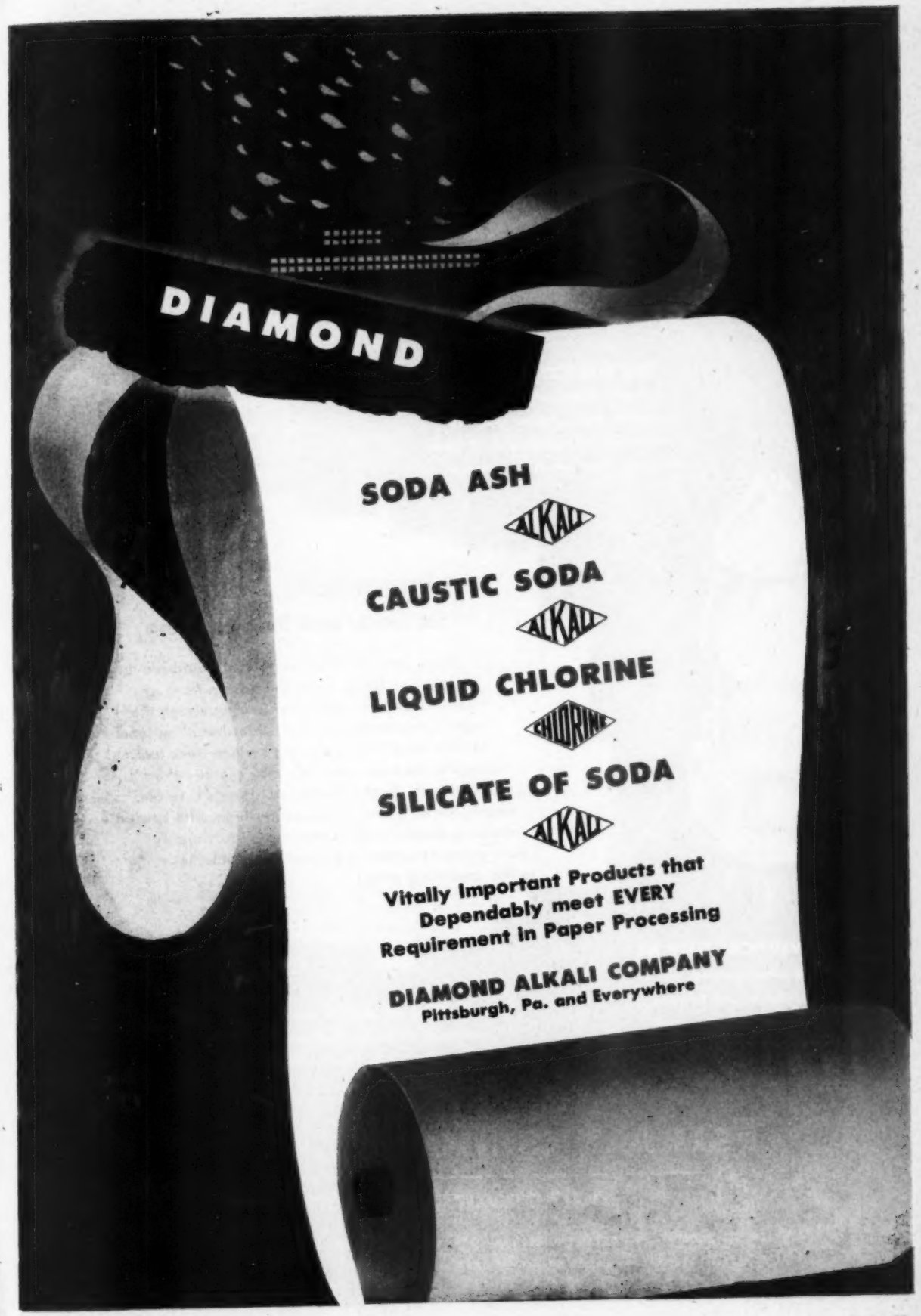
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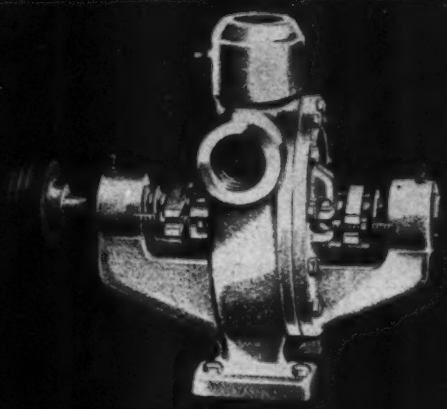

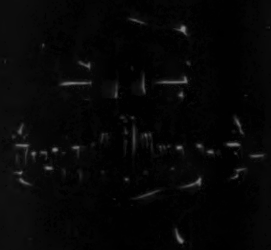

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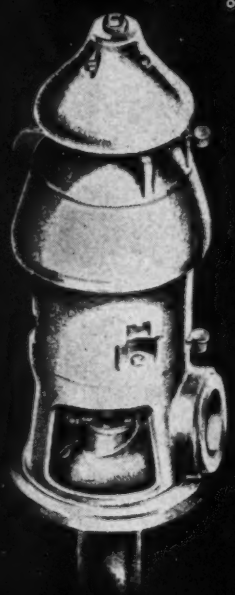

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FOR THE PAPER INDUSTRY

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EDITORIAL

The Paper Industry Needs More Production

▶▶▶ THE PAPER INDUSTRY has the bear by the tail. In this respect, it is like the U.N.O.—it can't let go and it can't go ahead.

The people of the United States are the greatest consumers of paper on earth. The paper industry has done a handsome job of providing the growing population of this country with all the paper products demanded for the constantly expanding end uses for paper.

From the turn of the century in 1900, when seventy-five million people consumed 2,167,000 tons, up to and including 1941, when one hundred and thirty-three million people consumed twenty million tons of paper, the paper industry never has failed to provide the abundant supply of paper products from which every need was filled.

Now, comes 1946 . . . The population is estimated to be one hundred and forty millions and the end uses of paper products have multiplied greatly. The consumers need more paper, want more paper, have planned their enlarged activities predicated upon an expansion of paper production, but it has not been forthcoming.

The result of the present situation is that many vital industries to which paper products are a vital necessity, are without supplies, threatening a curtailment, and, in some cases, a shutdown of operations.

The paper industry is alive to the needs of its constituent consumers of its products. It wants to supply them, but finds itself unable to meet the demand which is so rapidly outstripping its ability to produce.

Since 1941, when the industry reached its peak of production, and the consumers, their peak consumption, production has declined, while the consumers took all the intervening current production and licked up all stocks, inventories and reserves in every position, due to an expanded, increasing, insatiable demand for more paper products from everywhere.

To get more paper products, the industry must produce more.

Look at the operations for 1942, 1943, 1944 and 1945 compared with 1941. The paper division of the industry lost 893,825 tons; the board division of the industry gained 505,668 tons. The net, is a production in 1945 of 388,157 tons, less than in 1941.

That's a sour picture of four years operations to look at.

New mills are needed bitterly. During the war, critical materials were practically unobtainable for new mill installations.

Having emerged from the war, but still under the control of the OPA, the industry is facing vital new building obstacles. It takes time to organize and build new mills.

Some new mills are already projected, but the earliest dates at which they can be completed, will be late in 1947 or early 1948. By that time, it will require the equivalent of forty mills making four hundred tons a day for 310 days of the year to relieve the present acute shortage in supply. This is a conservative estimate.

This great, growing bear-of-demand, which the paper industry is inextricably hooked onto, is liable to act up right ugly if assurances of adequate supplies of paper products are not presently forthcoming.

Short-Sighted Management

▶▶▶ "I HAD TO TALK the boss into letting me attend this meeting." In those very words, a research worker introduced himself to one of the speakers at the close of a rather recent technical meeting. Then, in continuing his remarks, he added, "I wanted to come especially to hear your paper; and I haven't been disappointed."

A research worker of necessity is an idea man. Ideas are his stock in trade. He must seek them. He must create them. He must put them to work. Without them there would be no research.

Is it conceivable the boss figured that time spent by the research worker in attending a technical meeting was unproductive—that the only productive time is when the researcher is busy with his test tubes, balances, Erlenmeyers, condensers and other apparatus of one kind or another? If such were his thoughts he certainly is short-sighted.

In the first place, if the research worker is sufficiently important to be entrusted with important problems relating to product development, he surely can be trusted to keep such work confidential wherever and whenever necessary. There would be little risk of his divulging any trade secrets in open meeting.

Then again, where do ideas come from? How do ideas germinate? It may be that some ideas come to the recluse who seldom makes outside contacts, but generally, it is believed, ideas come easiest where they flow easiest, such as in a lively and spirited discussion period following the presentation of a stimulating and thought-provoking paper. In other words, and within reason, the more contacts, the more ideas.

Anyone who has driven a team of horses hitched to a heavy load knows that the pull is greater when the reins are not too tight. So it is with the research worker, he can do more work when he is not held back by tight rein tactics of the front office.

In the words of Wendell Phillips, "To be fossilized is to be stagnant, unprogressive, dead, frozen into a solid. It is only liquid currents of thought that move men and the world."

Why not a U. I. O.?

WILLIAM SIBLEY

▶▶▶ DID YOU EVER STOP to think that the United Nations Organization with its plan of action might well provide a pattern for this country to consider domestically, and possibly apply their principles of organization to the correction of our domestic ills?

When it was a matter of life and death for the nation, capital, management and labor pulled together in grand fashion. So long as it was an all-out effort to build "too much, too soon," regardless of cost, all of us rather successfully buried our personal likes, dislikes, demands and requirements, for the national good. But once the war was over (and, parenthetically, not a single peace treaty has as yet been signed) both labor and management (but more especially the former) started a long series of crippling strikes, walk-outs, vacation-strikes, etc., some of which continue and all of which have criminally kept armed forces abroad, reconversion from being promptly effected, unemployment from raising to disturbing heights.

The present industiral ferment is affecting every one of our one hundred and thirty million people. It is costing this nation lives, health, happines, prosperity. Not only does the present national upheaval envelop our whole people and contribute heavily to their living expenses, needs and wants, but it is becoming a rapidly accelerating force which may destroy the industrial leadership of the United States in world affairs. In the race for world production, this country must keep as far ahead of other nations as we were militarily at the end of the war. We must not lose our lead in the peace work which lies ahead. . . . Yet, if we cannot settle our own domestic affairs without strife—we most surely shall lose.

What better then than to lift a leaf out of U. N. O.? The best minds of the world conceived and composed that organization. So—let the best industrial and labor minds of this nation contrive a domestic U.N.O. for the purpose of preventing or circumventing domestic industrial wars, as the big U.N.O. is expected to prevent international wars. . . . Why not a "U.I.O."—a United Industrial Organization. (There is a better name for such an organization, but to carry on the comparison, let me say it that way, first.)

Let's consider the formation of a new group—for example, the "National Economic Relations Board," or something such. This "board" should have representation from all phases of American life. Yes, "life," since the housewife and the small merchant are as vitally involved with industrial strife as the operator of the steel mill or the leader of a union. This "board" might properly be made up of representatives of the following elements: (A)—Management; (B)—Organized Workers; (C)—Unorganized Workers; (D)—General Public; (E)—Government Ideology, and (F)—U. S. Constitution Ideology.

The six interests listed above definitely represent distinct factors in every controversy. The "unorganized workers" would represent such people as clerical workers, office workers, writers such as me—also you, perhaps. "E"—the fifth element should be there because everyone should recognize that our national conduct is, to greater or lesser degree, influenced by other governments, more especially in the matters of socialization, subsidization of enterprise, fixation on inflations, price controls, etc.

The over-all province of such a "board" would be to give careful and sober study to the over-all picture of labor-management relations within the United States, first to the nation, and secondly to the world. It would become a tribunal which would integrate the whole industrial field. At present there are upwards of a thousand separate and distinct disputes—each with its own standards of demand; each with its own separate achievements of results; all without co-ordination and without representation of anyone save the contending parties. This is as it should *not* be.

The new "board" would bring to bear upon the public and the press a wide national viewpoint in public opinion. While a "board" would not necessarily (and indeed should not) have the power to enforce its findings or decisions, its final conclusions would have great weight, and might well carry insurance of industrial peace. Made up as it should be, the very nature of the makeup of its constituency would make it a sound tribunal. Its power of correlation of all national industrial questions would prevent stoppages of production, which are, at present, the first overt acts of industrial troubles.

In contrast to the foregoing positive plan, there is nothing, at present, that might be called "tribunal"—no body to speak for all the varying and deeply concerned interests which are affected. We have, at present, no nationally representative authoritative body to intelligently plan a course of action which would avoid production tie-ups—all of which have their attendant widespread hardships and financial losses.

It is about time we put our own selves under the guidance of some national organization—the "United Industrial Organization"—the "National Economic Relations Board"—or name-your-own. We *do* need such co-operative guidance. . . . Why not take a lesson from the almost-successful U. N. O.—and make it apply itself, successfully, to our industrial problems.

cutting bacterial action in cutting oils

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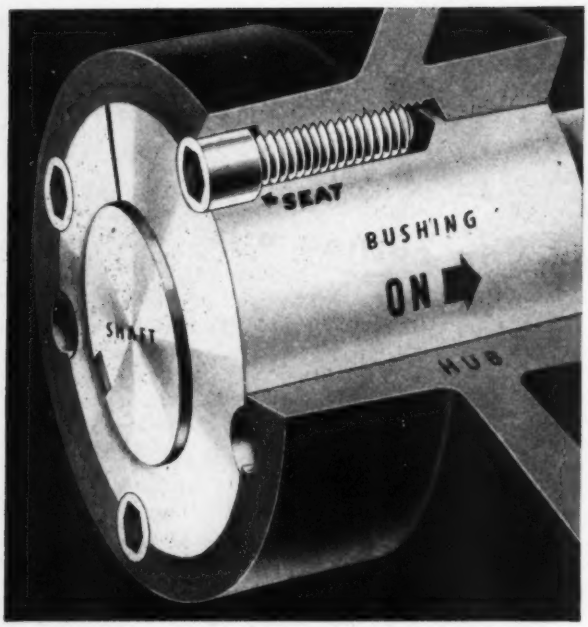
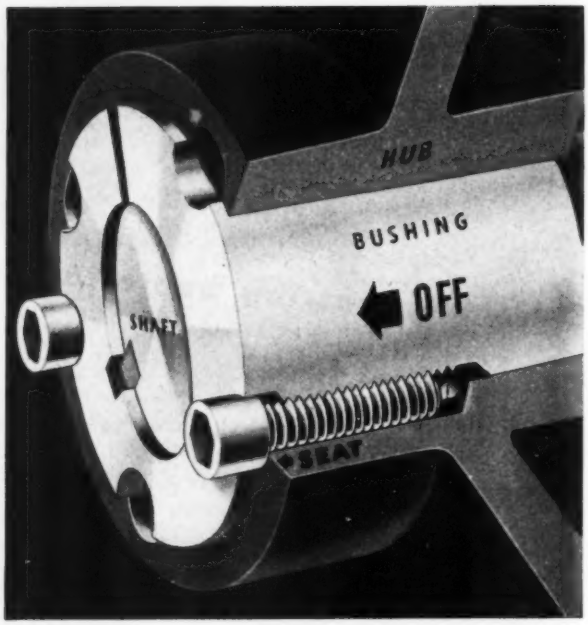
...SIMPLE, ISN'T IT?



Note that only the HUB is threaded. Screw-head seats itself against offset in bushing. As the screw is turned, the sheave is drawn up—wedged—with a firmness equivalent to a shrunk-on fit, whether the shaft is standard or normally undersize.



Note that here only the BUSHING is threaded. Screw-head seats itself against face of hub. As the screw is turned, the wedge is disengaged. Due to its steep taper, the bushing disengages with less effort than in any other sheave.

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Then about 105 A.D. a Chinese craftsman, T'sai Lun, whipped mulberry bark and other fibres to a pulp, mixed it with water, poured it over grass cloth moulds. The excess water seeped through and left a film of matted fibre. Dried in the sun, then rubbed smooth, the result was paper! Yes, paper made on the same basic principle that we use today! In that dramatic moment when T'sai Lun displayed the first sheet of paper—he revealed a discovery that was destined to change the world.

The dramatic story of paper and its contribution to the advancement of civilization is told in the sound-and-color film, "Paper—Pacemaker of Progress," presented as a tribute to the Paper Industry by F. C. Huyck & Sons on the occasion of its 75th Anniversary.

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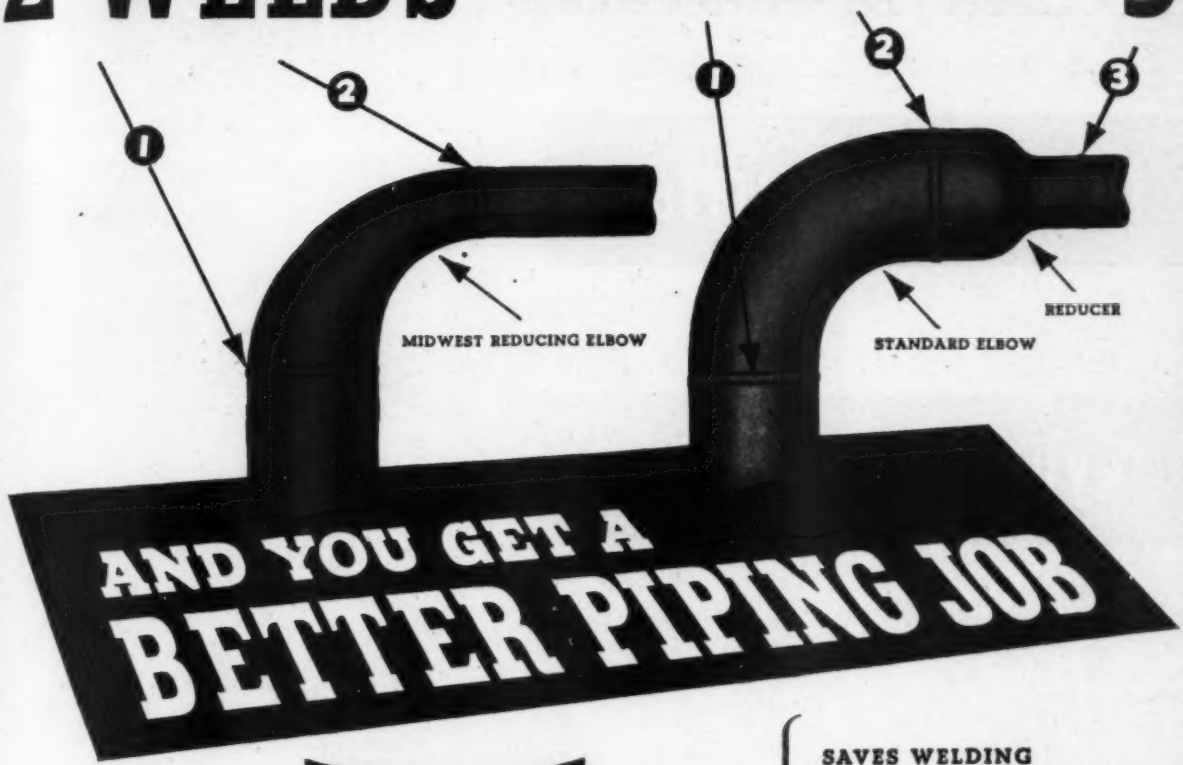

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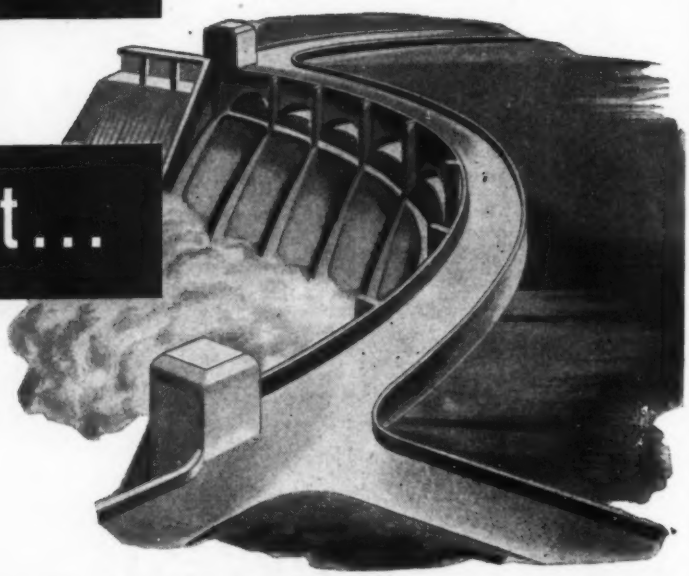

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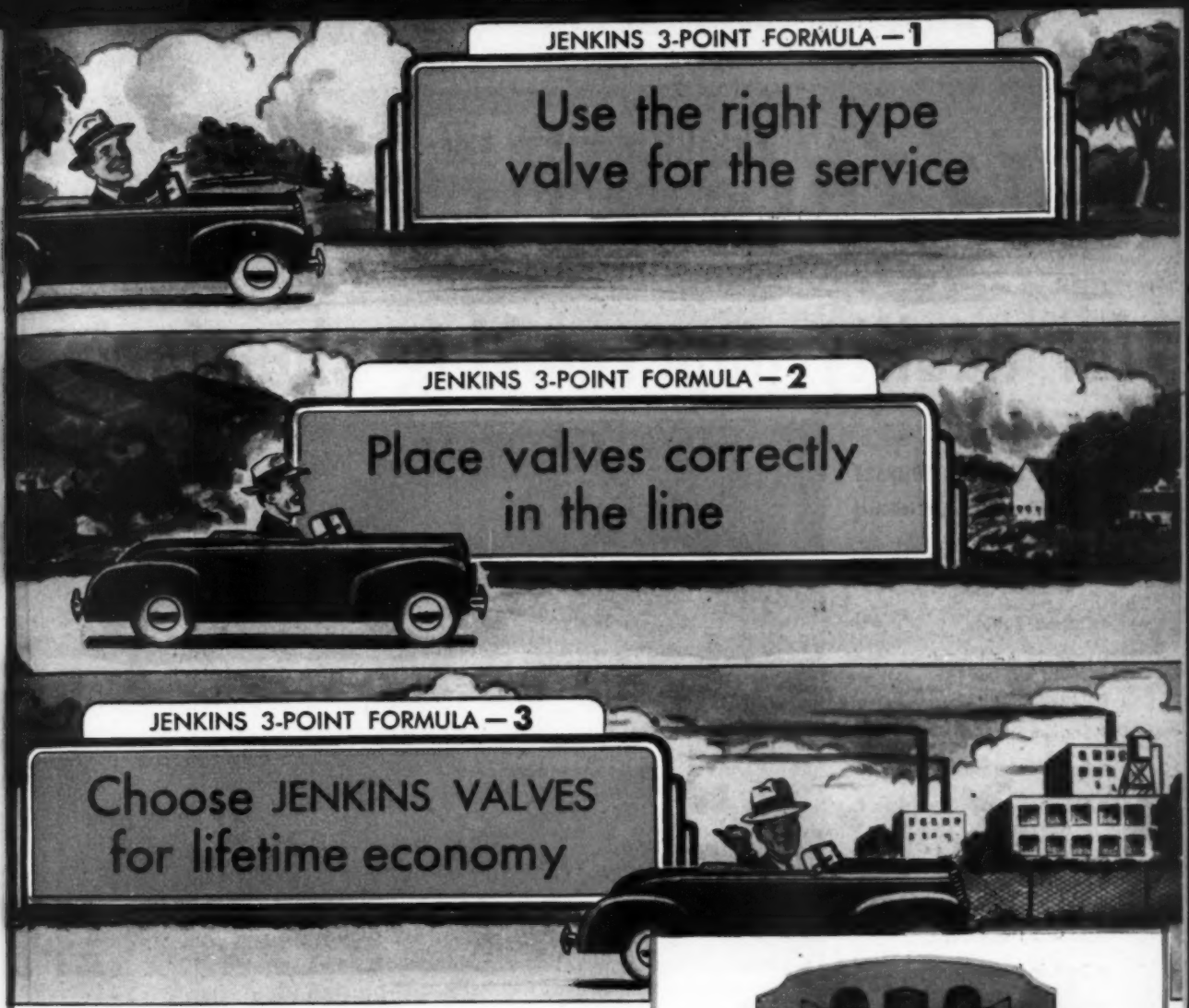
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Place valves correctly in the line
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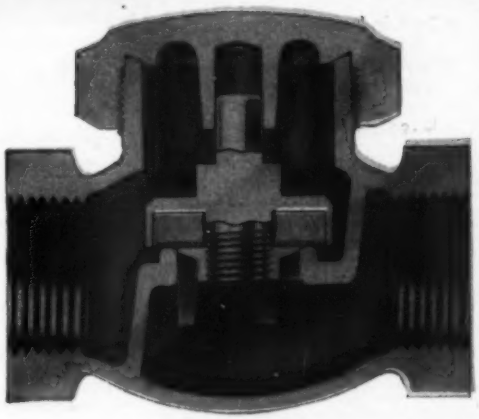

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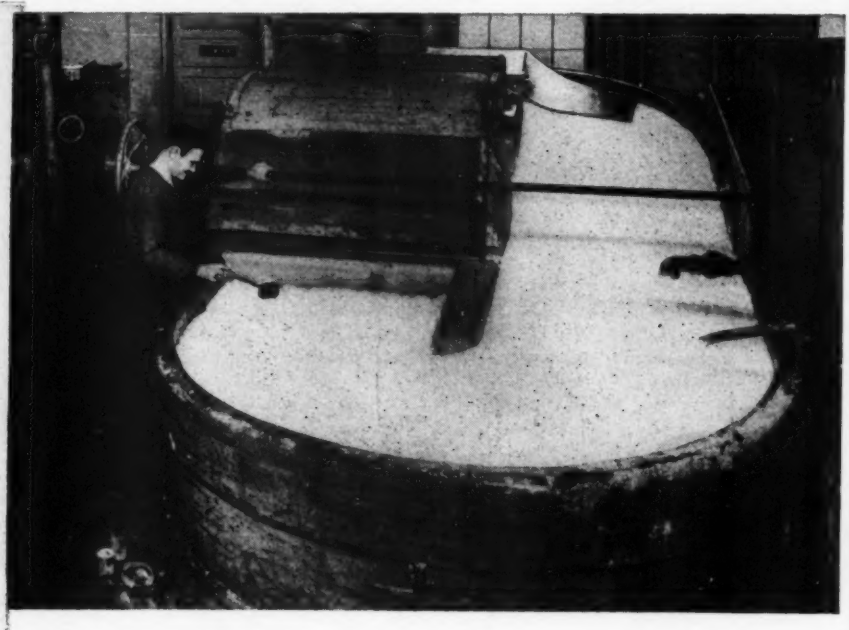

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THE PAPER INDUSTRY
and PAPER WORLD

APRIL, 1946

Treatment of Waste White Water

at Beach & Arthur Paper Co.

ARTHUR W. REDLIN[1] and
J. J. GILBERT[2]

▶▶▶ AFTER TWO YEARS of operation at Beach & Arthur Paper Company (Modena, Pennsylvania), it was found that the lagooning of waste white water was not practical, nor was it an effective way to prevent stream pollution.

The plant had begun operations in 1937, and in the course of events, World War II, with its priorities, interfered, and it was not possible to construct and put into operation a satisfactory treatment plant until January, 1945.

This paper mill, at the present, has an average capacity of 30 tons per 24 hours and operates on a six-day week. Sixty-five per cent of the total production is on six colors and white manifold and writing paper. The remaining production is on die wipe and napkin papers. Bleached sulphite is the principal pulp used in the manufacture of these papers.

Design

As the first step in the solution of how economically to treat the waste water, it was felt that the best results could only be obtained with a complete white water system of recirculation and the minimum use of fresh water. Also, all water from mill drains, floor drains and bearing cooling waters should be treated so that there would be no possibility of untreated wastes entering the stream. In order to prevent an excess wastage of surplus white water and an excess usage of fresh water, a system of signal lights was installed so that the foreman would know when surplus white water was being discharged or when fresh water was being added to the system. After the completion of the first step, and as the second step, E. B. Wagner, borough and consulting engineer of Downingtown, Pennsylvania, was retained to make a complete survey and to design the necessary treatment units. Flow tests showed that an average of 14,000 to 18,000 gallons of waste were produced per ton of paper manufactured. On a 25 ton-per-day production basis, this results in a waste volume of approximately 450,000 gallons per day. Tests in the chemical laboratory of the plant indicated that with proper chemical dosages, a mixing period of 15 minutes and a settling period of 4 hours would produce a satisfactory effluent. The plant was designed for these detention periods but increased production to 30 tons per day has increased the average flow to 540,000 gallons per day and reduced the actual mixing time to 12.5 minutes and the settling period to 3.2 hours. All surplus white water passes through a 70-mesh cylinder mold type of save-all before being discharged to the waste treatment plant. The solids reclaimed from this save-all contains

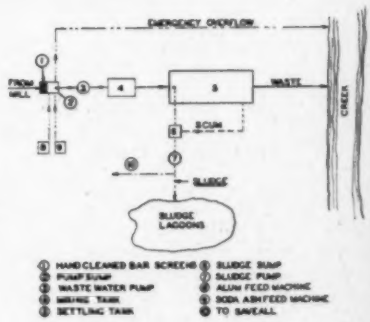


Fig. 1—Flow diagram waste water treatment plant

TABLE 1

	Per Cent Dry Solids in as Received Sample	Per cent Water in as Received Sample	Per cent Long Fiber on Oven Dry Solids	Per cent Ash on Oven-Dry Solids	Fiber Analysis
Sampled from Dry Pile—					Long and short fibers from chemically prepared pulps, short fibers of ground wood, plus non-fibrous materials such as clays, alum floc, etc.
1' from top...	21.0	79.0	21.4	18.7	
2' from top...	20.0	80.0	24.0	20.8	
3' from top...	21.0	79.0	16.1	20.8	
4' from top...	22.3	77.7	12.5	24.2	
5' from top...	23.2	76.8	34.0	15.8	
Sampled from Wet Pile—					
3' from bottom	18.0	82.0	16.7	23.6	

(1) Vice president in charge of manufacturing, Beach & Arthur Paper Co.; (2) engineer in charge, sanitary engineering division, Link-Belt Company.

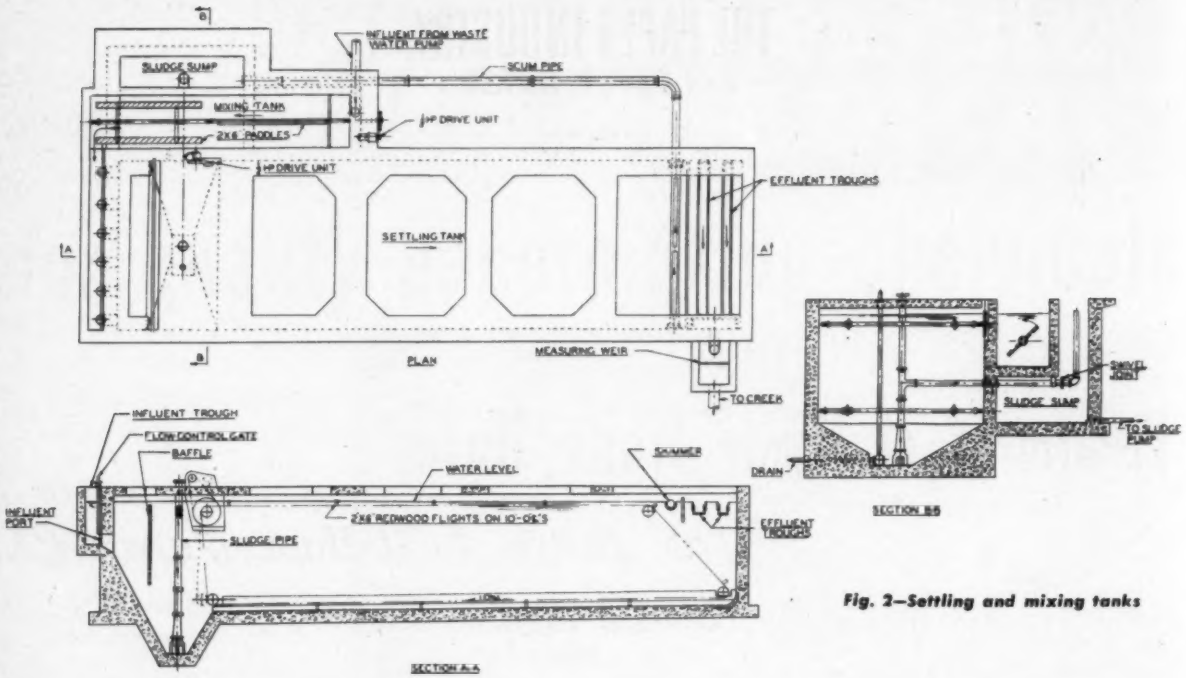


Fig. 2—Settling and mixing tanks

about 92 per cent moisture and are returned to the stock chest for re-use.

Treatment Plant

The wastes are treated as shown in the flow diagram (Figure 1) by first passing through hand cleaned bar screens with ½ clear openings. These screens are located at the influent end of a pump sump where alum and soda ash are added so that a flash mix is accomplished as the waste is pumped to the mixing tank. The waste pump is of the centrifugal type and has a capacity of 1100 gpm but is throttled to give a somewhat reduced discharge. (This pump was only one available at the time plant was constructed.) Dry feed machines are used to feed the alum and soda ash.

The main treatment units, arranged as shown in Figure 2, consist of a mixing tank 5 ft. wide x 5 ft. water depth x 25 ft. long having a capacity of 4,680 gallons and a settling tank 16 ft. wide x 10 ft. average water depth x 60 ft. long having a capacity of 72,000 gallons (Figure 3). The waste and chemicals (alum and soda ash) while passing through the mixing tank are flocculated by a slow horizontal shaft mixer. Experience has shown that a mixing period of 30 minutes would probably result in a quicker settling floc with a reduced chemical dosage (Figure 4). The flocculated wastes then enter the settling tank which is equipped with a sludge collector (Figure 5). This sludge collector serves a dual prupose in that it collects the flocculated solids, which settle to the bottom, in a hopper at the influent end of the tank and the scum, which floats on the surface, at the effluent end of the tank (Figure 6). The sludge is withdrawn from the hopper to a sludge sump by means of a swivel pipe under hydrostatic head. A skimmer removes the floating scum to the same sludge sump (Figure 7).

A centrifugal sludge pump discharges the sludge to a lagoon of one million gallons capacity. Withdrawal of the liquid waste from the settling tank is by means of two steel effluent troughs from which it flows into the west branch of the Brandywine Creek.

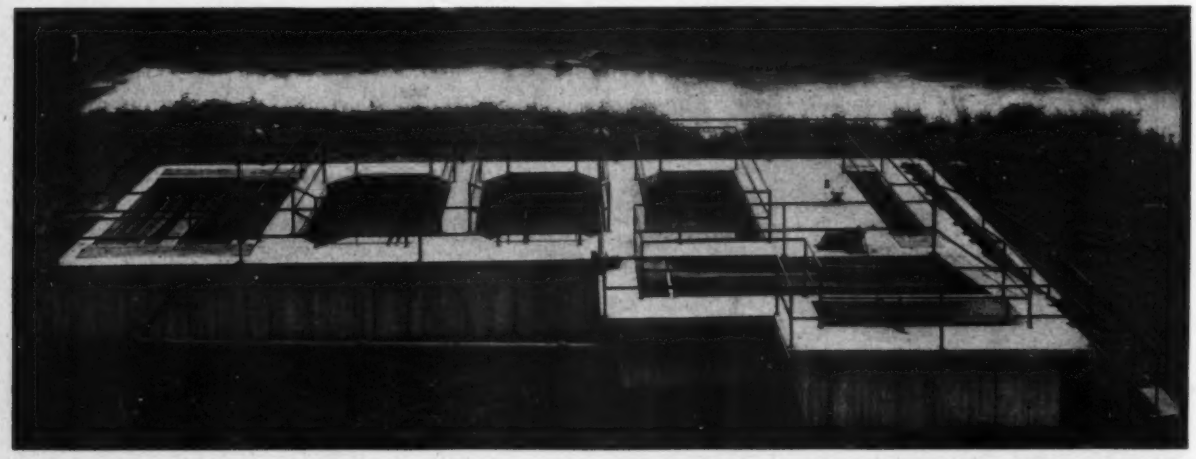


Fig. 3—General arrangement of waste treatment plant showing settling tank, mixing tank, and sludge sump

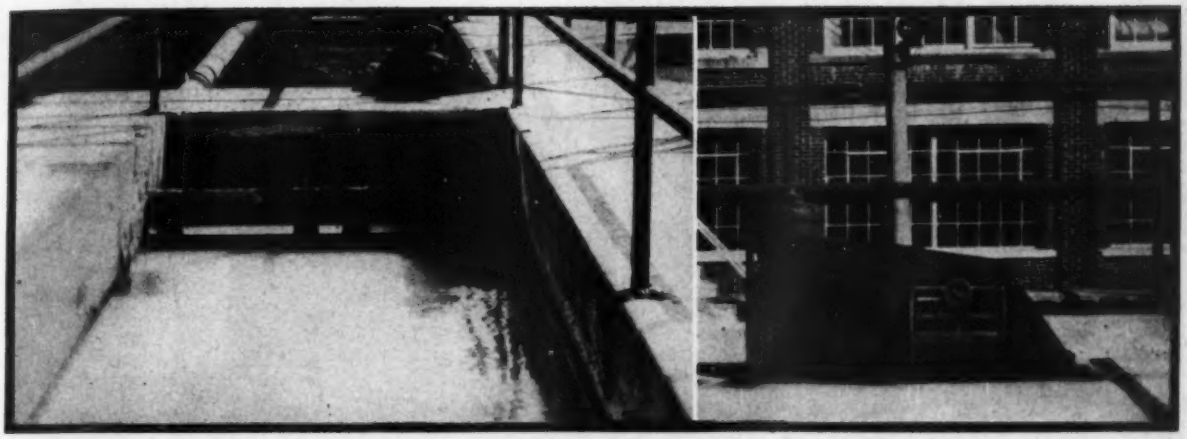


Fig. 4 (left)—View of influent end of mixing tank showing influent baffle and drive unit. . . . Fig. 5 (right)—Drive unit of sludge collector in settling tank. Float control switch for sludge pump shown in background

Operation

The plant is designed so that the operation is as nearly automatic as possible, one man operating both the water filter plant and the waste treatment plant. The bar screens must be cleaned several times a day so that the larger solids are not forced through the bars where they would clog the foot valve on the waste water pump suction line. This pump operates automatically on a differential float control in the sump. The high pumping rate of the waste water pump causes surges through the mixing and settling tanks. Consideration is now being given to the installation of one 300 gpm pump to pump continuously and a duplicate pump to be float operated and to take peak loads. The chemical feeders are filled once a day and regulated so that the average feed is 100 lb. of alum and 50 lb. of soda ash per day, or about 24 ppm of alum and 12 ppm of soda ash. Best results are obtained when a *p*H of 6.2 to 6.3 is maintained on the effluent at the creek. The slow mixers and the sludge collector run continuously with sludge being withdrawn and pumped to the lagoons for a period of about one hour every morning. The length of the pumping period depends on the time required to remove all the sludge from the settling tank. Tests are now being planned to determine if the operation of sludge collector can be reduced to several hours per day.

During the early months of operation of the waste treatment plant, the sludge from the settling tank was pumped to a save-all of the blanket type equipped with a coarse paper mill weave felt. This save-all reduced the moisture content of the sludge from approximately 96 per cent to 82 per cent. The analysis of this sludge is shown in Table 1.

TABLE 2

	Stream Above	Untreated Wastes	Treated Wastes	Per Cent Removal
Turbidity	25 ppm	700 ppm	40 ppm	94
Total Dissolvved Solids	140 ppm	220 ppm	280 ppm	..
Vol. Dissolved Solids	80 ppm	100 ppm	120 ppm	..
Fixed Dissolved Solids	60 ppm	120 ppm	160 ppm	..
Total Suspended Solids	30 ppm	520 ppm	40 ppm	92
Vol. Suspended Solids	30 ppm	460 ppm	40 ppm	91
Fixed Suspended Solids	0 ppm	60 ppm	0 ppm	..
Oxygen Consumed	3.8 ppm	52 ppm	9.6 ppm	..
Total Alkalinity	31 ppm	26 ppm	32 ppm	..
B.O.D. (5 day)	2.2 ppm	145 ppm	14 ppm	90
pH	6.9	6.4	6.3	..
2 hour Settleable Solids	.05 ml/1	65 ml/1	2.0 ml/1	..
8 hour Settleable Solids	.05 ml/1	55 ml/1	2.0 ml/1	..

OTHER DATA

Tons of product per day	28.5
Gallons of waste water per day	520,000
Gallons of waste water per ton of product	18,400
Total sewage B.O.D. population equivalent	364
Sewage B.O.D. population equiv. per ton of product	13
Volatile S.S. in lb. per ton of product	6.1

(During this survey a clean-up occurred on one of the two machines at this mill.)

It was felt that this sludge or reclaimed solids could be used in a nearby board mill, however, after several months use it was found that the per cent of long fibers was too low and the ash content too high. The reclaiming of this material was discontinued and the sludge pumped to a lagoon of one million gallons capacity.

After eight months of operation, this lagoon is practically full and the sludge soon will be diverted to a second lagoon of 2.5 million gallons capacity. It is contemplated that the sludge in the first lagoon will dry sufficiently to be removed prior to filling of the second lagoon. Two one inch garden hoses connected to floats are used to decant the clear liquid from the surface of the lagoon. A float switch controls the sludge pump so that the sludge sump is automatically emptied when it becomes full.

Results

While the waste plant is now operating at an average of about 115 per cent of its design capacity, the results have met the highest expectations of all concerned. On March 13, 1945, the Pennsylvania State Department of Health sampled the Brandywine Creek above the plant, the untreated wastes and the treated wastes with the results as shown in Table 2.

A communication from the Pennsylvania State Health Department indicates that practically every paper mill can reduce its waste to a B.O.D. population equivalent of 30 per ton of product and volatile suspended solid content of 10 lb. per ton of product. The population equivalent of 13 and suspended solids content of 6.1 lb. for this plant from the above test are well within these figures.

Summary

It is felt desirable to summarize the following points of this paper:

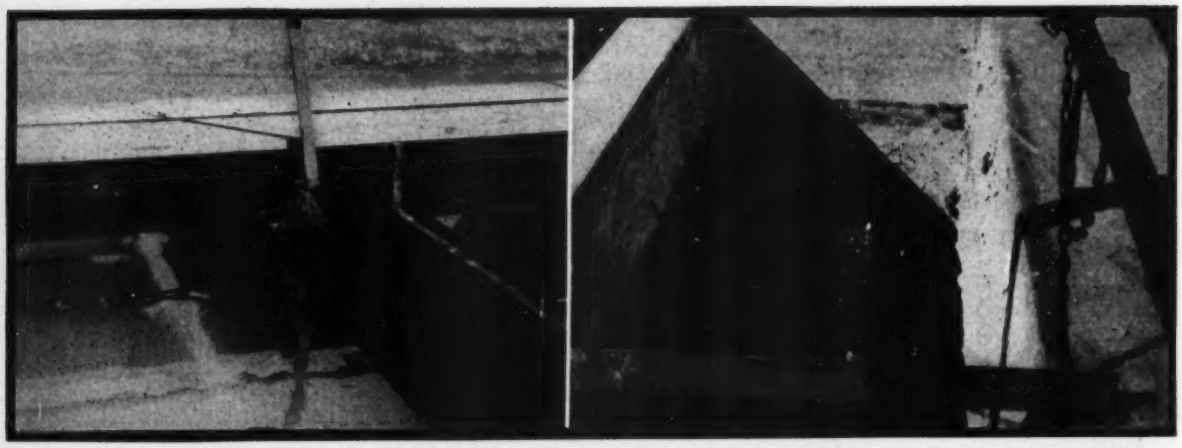


Fig. 6 (left)—Scum skimmer at effluent end of settling tank with effluent troughs in the background. Note the clearness of water in that the chain sprocket and shaft of the sludge collector can be seen below the water level. . . . Fig. 7 (right)—Sludge sump swivel pipe is raised and lowered by chain to control rate of sludge withdrawal

1) Every effort should be made to keep water usage and wastage to a minimum.

2) For best results the detention periods in the mixing tank and settling tank should be 30 minutes and 4 hours respectively.

3) Waste should be pumped at a constant uniform rate to the mixing tank.

4) Use of reclaimed stock has not proven practical to date.

5) Operation procedures are very simple.

6) Proper design and good operation will produce an effluent of superior quality.

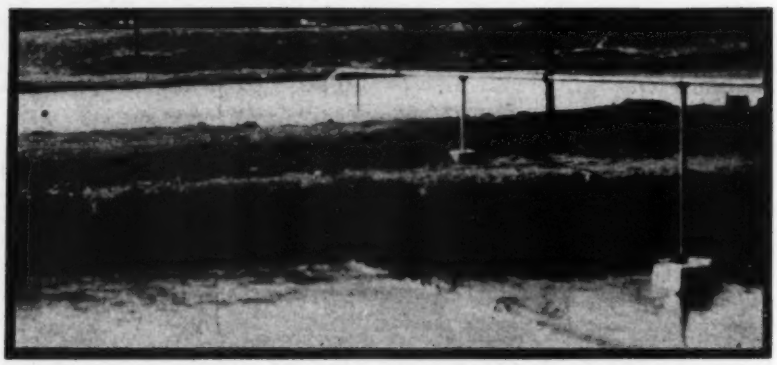


Fig. 8—Sludge being discharged across Brandywine Creek into a one-million-gallon lagoon

Private Industry Urged To Have Organized Programs for Hiring Veterans

The co-operation of industry is being solicited by government agencies to aid veterans in returning to civilian employment and to gain the greatest benefits to the employers in securing workers from the fine pool of discharged service men and women. Perry Faulkner, chief of the Veterans Employment Service of the U. S. Employment Service, and Robert C. Goodwin, USES Director have publicly urged employers to plan organized programs for hiring veterans and assisting them in finding the right job in their establishments.

How to establish the kind of a program which will be of the greatest assistance to veterans is outlined in an *Employers' Guide* now being distributed through local offices of the USES and state offices of Veterans Employment Service representatives.

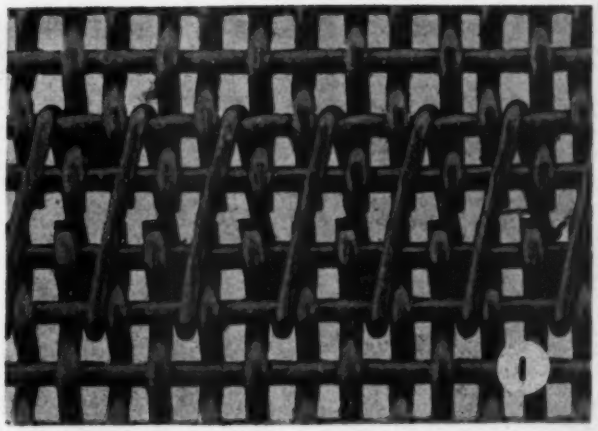
"It is of the utmost importance that employers who have not developed organized veterans programs adopt such programs at once," said Mr. Faulkner, who serves as executive secretary of the Veterans Placement Service Board, as well as VES Chief. "Vet erans are returning home by the millions and jobs must be found for them as promptly as possible. By calling at USES offices and listing all their job openings and particularly their high quality jobs, employers will be doing themselves as well as the veterans a real service."

In a foreword to the pamphlet, President Truman says:

"The spirit of America is the spirit of independence. Americans are typified by our fighting men: they seek no favors; they ask only for the right to make their own way. They want only one assurance; the right to work out their own destiny. They deserve that right and we are determined that they shall have it. Government alone cannot do the job—private industry must co-operate. By pooling the vast resources of our country, we can make it possible for every returning service man and service woman to find a job. They do not want a dole. They ask only the right to continue and improve our American standards of living."

A pledge of "full aid and support" to the program has been given by a number of large national bodies including the Chamber of Commerce of the United States and the National Association of Manufacturers.

Electrolytic Corrosion of Fourdrinier Wire Seams



Prepared by Staff of Research Laboratory
The Lindsay Wire Weaving Company

▶▶▶ THE PHENOMENAL growth of the graphic arts and packaging by means of paper and paper products has placed new and unusual demands on the manufacturers of fourdrinier wires. The seam, or joint, in the wire cloth, which makes the length of wire mesh into the endless wire cloth belt, has been transformed dramatically and has been no exception to the mounting tide of technical advancement.

Fifteen years ago the majority of seams furnished in fourdrinier wires were stitched by hand. (Figure 1 shows an early type of sewed seam.) However, with increasing machine speeds, new seams had to be developed. The silver-soldered or "brazed" seam which emerged about this time, has increased in popularity until today perhaps 90 per cent of all seams furnished are of this construction. (Figure 2 shows a modern silver-brazed seam.)

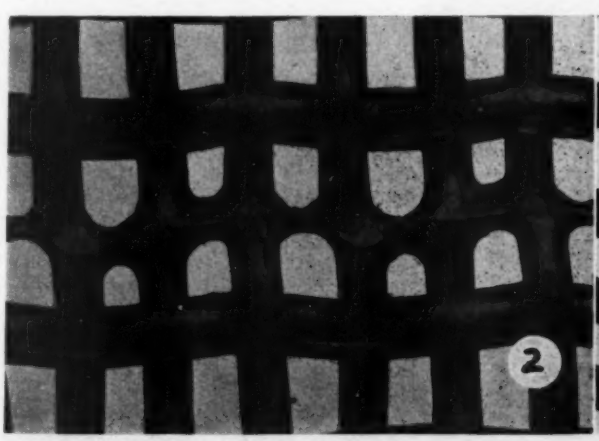
Advantages of Silver-Soldered Seam

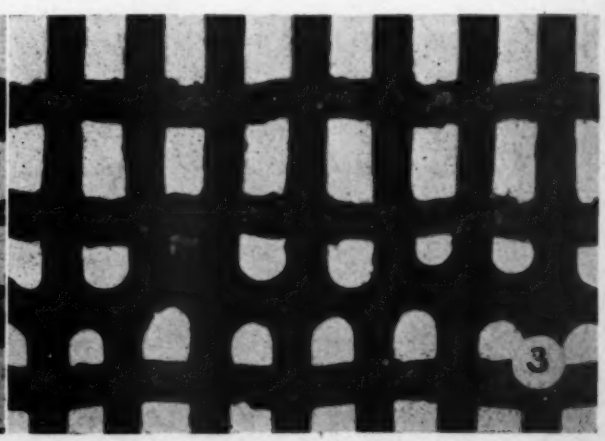
The advantages of this design of joint are obvious The drainage and sheet forming properties of the mesh are almost identical in the seam area to these properties in the "body" of the wire. They are relatively free from the tendency to clog with stock, and do not offer any considerable interference to the flow of stock on the wet end of the machine. As a consequence, the silver-soldered seam does not mark the sheet at higher machine speeds and has been widely accepted by the paper mill operators.

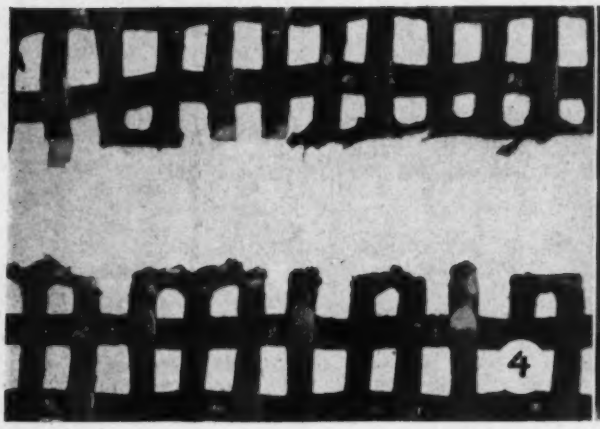
From the machine tender's point of view, all that could be asked of a seam was that it did not give him trouble due to marking of the sheet, and did not fail or cause early failure of the wire. Generally speaking, the three prime causes for wire failures (abrasion, fatigue and corrosion) did not enter into the life of a brazed wire seam. Abrasion did not normally affect it because the joint area was located above the plane of the bottom of the cloth, and little, if any, wear took place in the joint. Although fatigue is always a problem, few seams failed from this cause because they had bending properties almost identical to the wire cloth itself. Corrosion did not seem to enter the picture, since in normal corrosion the silver alloys used in the braze were as corrosion-resistant as the phosphor bronze in the wire cloth warps. Figure 3 shows a wire seam which operated under extreme corrosive conditions, as evidenced by the pitting of the brass weft wires. The seam, however, is unaffected.

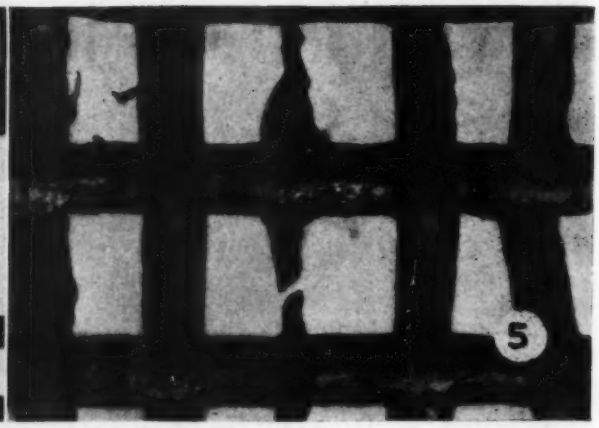
Electrolytic Corrosion

As time went on, however, it became evident that brazed seams could be seriously affected by a special type of corrosion providing that conditions during the operation of the wire favored its development. This type of corrosion is known as electrolytic corrosion, sometimes referred to as "galvanic corrosion." As the name implies, it is associated with the passage of an electrical current. In this case the electrical current does not come from any conventional source of electricity, but is generated within the wire itself. When any two dissimilar metals are immersed in an electrolyte (current-carrying medium), such a current is generated. In the case of the brazed fourdrinier wire seam, the dissimilar metals are the silver brazing alloy and the material from which the wire cloth is manufactured, either brass or bronze. When the two metals are in intimate contact the current generated is generally of a higher mag-









nitude, and this is the case of the wire seam. (Figure 4 illustrates the appearance of a seam that failed in electrolytic corrosion.)

Effect of Corrosion

This type of corrosion is nothing new in paper mill operation. Machine parts on the wet end involving couples of monel metal to steel, steel to brass, etc., have shown a tendency to result in severe local corrosion. Furthermore, in cylinder mills wire cloth covers for cylinders have often been installed using dissimilar metals. Stainless steel covers over a bronze or brass underface or binding wire resulted in severe localized corrosion on brass or bronze (as shown in Figure 5).

Another interesting example has come to light in recent years and involves the use of stainless steel stitching wire for seams in coarse mesh wires or in the repairing of breaks in these wires. In this case the brass shute wires are strongly attacked where the steel wire crosses it. Note in Figure 6 the localized attack on the brass shute wires where the steel wires contacted them. In some places the brass wires are completely "eaten away." Moreover, the electrolytic attack did not always favor the stainless steel wire. Figure 7 shows a piece of stainless steel stitching wire taken from a sewed seam run under the same general type of conditions, but in this case *the fourdrinier wire itself was not attacked,* although the stainless steel pitted severely and failed under electrolytic corrosion.

Causes of Corrosion

The logical question is, then: "How can you tell when you are going to have this type of corrosion and what metal is going to be attacked"? The answer seems to be at least at this writing: "You simply cannot determine exactly when or where electrolytic corrosion is going to take place."

All that can be said is that when conditions are right, electrolytic corrosion will take place. What are these conditions? Outside of the prerequisite of two dissimilar metals (a metallic couple), the electrolyte is probably the next most important item. The authors of this article do not claim to be familiar with the conditions under which most paper mill wires are operated. We do know, however, that in some mills it has been recognized that the mill waters are definitely responsible for the occurrence of electrolytic corrosion on the wet end of the paper machines. Considerable study has been made of the mill and white waters in an attempt to determine just why the waters bring about this corrosive attack.

Observations

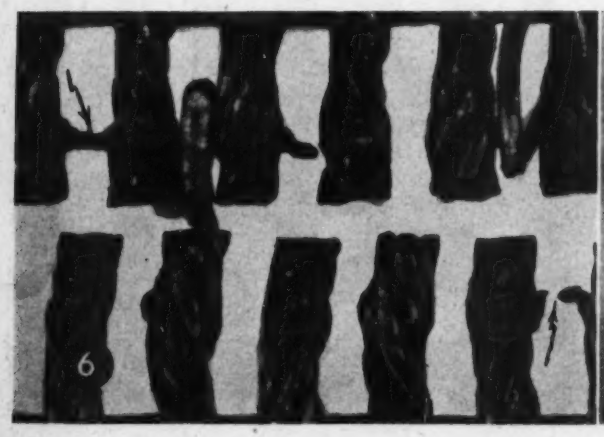
While we cannot draw any complete conclusions from the failures of fourdrinier wire seams through electrolytic corrosion on the paper machine, we should like to present here some of the facts which may or may not have a bearing on the case.

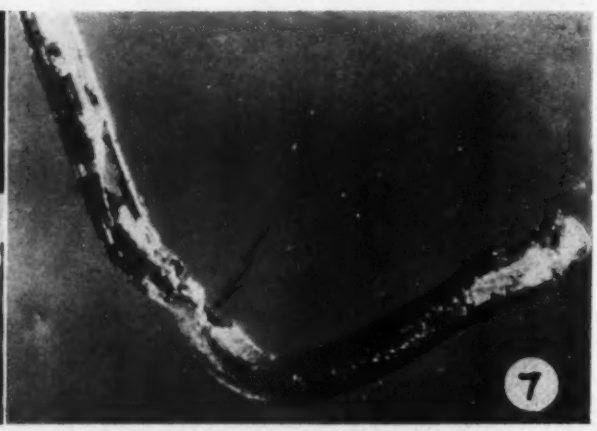
1)—Generally speaking, more seams fail in this manner in the summer months than in the winter months. Statistics have proved this to be a fact.

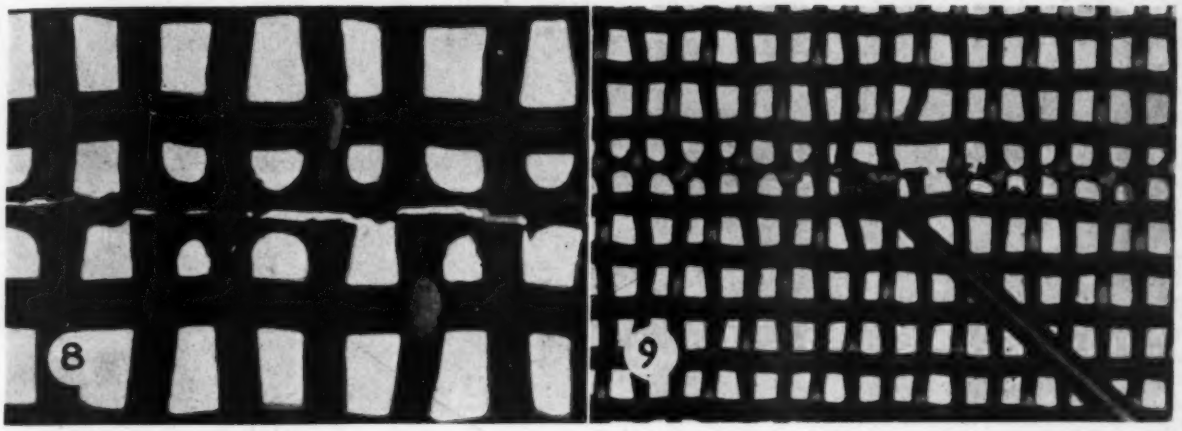
2)—Wires of all bronze construction are more readily attacked by electrolytic seam corrosion than ones with brass shute.

3)—River waters, where the possibility of sea water pollution at high tide exists, have been suspected as being a possible cause.

4)—The presence of large quantities of industrial waste materials in the mill water supply seems to ag-







gravate the conditions under which electrolytic corrosion will occur.

5)—It is strongly suspected, although not proven as fact, that electrolytic corrosion will occur when mill waters are basic (*p*H above 7.0). Generally, however, most instances have come to light where mill waters are acid in nature (*p*H below 7.0).

6)—The presence of hydrogen sulphide in mill water has been noted when electrolytic corrosion seam failures took place in certain mills.

7)—It has been noted on certain occasions that the use of improperly washed pulps containing a rather high concentration of bleach residues has resulted in more severe attack on the brazed seam in the wire.

8)—It has been suggested, but not proven, that certain of the processes for the manufacture of high wet strength papers involving the addition of an acid precipitant may be responsible for an increase of this type of corrosion whenever the paper stock has been prepared in this manner.

9)—The possibility should not be overlooked that other of the newer chemical compounds now used as additives to pulps for various reasons, such as slime elimination, may under adverse conditions contribute to electrolytic corrosion.

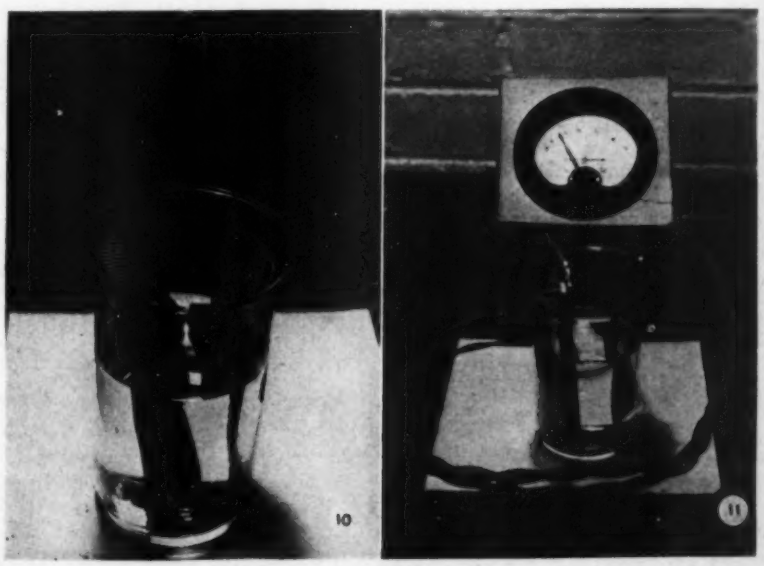
10)—Water temperature and degree of aeration should not be overlooked. As in the case of straight chemical attack, these factors are undoubtedly important in electrolytic corrosion also.

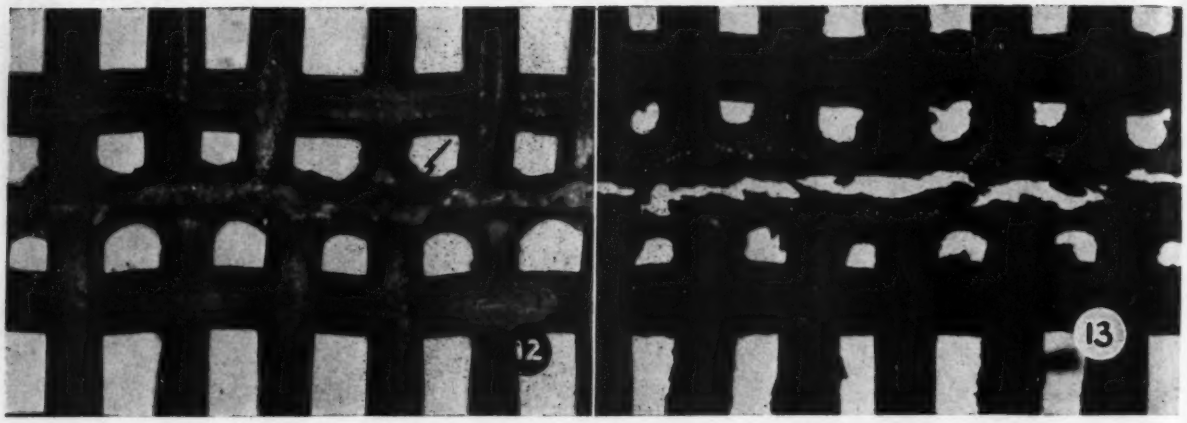
11)—Any condition which promotes the increase of organic materials in the mill waters may lead to an increased acidity in the mill water supply, producing a white water more corrosive in nature.

It can be seen by reviewing the above eleven points that they are eleven variables which may, in one combination or another, determine whether electrolytic corrosion will take place at the seam in a fourdrinier wire. From the evidence at hand a large percentage of fourdrinier wire seams used in normal paper mill operations show the effect of a mild form of electrolytic corrosion. This statement may be alarming to some of the readers of this article. Nevertheless many fourdrinier wires run a normal life on paper machines and the mill experiences no trouble with seam failures through corrosion. However, samples of seams returned to the manufacturer show in numerous cases that electrolytic corrosion has been actively eating away at the joint area in the seam. This corrosion had not been significant enough to materially affect wire life. In other words, the wire failed through normal wear or damage, before electrolytic corrosion had weakened the seam sufficiently to result in premature failure at this point.

Deceiving Factors

The examination of the seam area to determine whether electrolytic corrosion has been present is not as easy as it might appear at first. One of the salient features in this type of seam corrosion is often the uncanny fashion in which most of the evidence of corrosion is cleverly masked from view. By this we mean that very little akin to normal corrosion takes place in electrolytic corrosion of the silver-soldered seam. *The seam changes very little, if at all, in appearance even after electrolytic corrosion has advanced to a dangerous degree.* One seam returned to this laboratory had failed in a small area near the edge. Yet the remainder of the seam, as shown in Figure 8, was intact. We made some physical tests to determine the strength of the remaining seam sections that had not failed. The strength in tension in these areas was only ten per cent of the strength that could be expected from such a worn piece of wire cloth. The seam literally burst apart when tension was applied on the testing machine.





Significant Signs

On close examination with a low power magnifier three significant features may be detected which are typical of this type of seam failure. First, the solder fillets are only loosely bonded to the wire cloth and fall away readily when probed with a needle. Second, on close inspection it can be seen that the solder areas directly exposed to the mill solutions have become altered and no longer have the bright metallic luster characteristic of "unaltered" silver alloys. The solder is porous, spongy, grayish in color and easily broken up. Figure 9 illustrates the spongy soft character of a seam corroded electrolytically. The steel needle easily breaks the solder loose from the seam. Beneath this surface solder, however, can be found unaltered solder that will exhibit the metallic luster and flow of the new unattacked metal. Third, it will readily be seen that the warp wire ends have been pulled away from the solder fillets, leaving little cupped openings in the solder, the result of a localized electrolytic attack on the bond between the two metals.

Further Tests

We should like, also, to report on some results of laboratory tests which were made in an effort to duplicate conditions found in the mills. Figures 10 and 11 illustrate a simple type of electrolytic cell that can be set up to demonstrate the principles of electrolytic corrosion in fourdrinier wire seams. In Figure 10 a small piece of wire cloth is used as one electrode. The other electrode is a similar piece of wire cloth in which a silver brazed seam is located. The two are joined externally by a conductor wire, and a suitable electrolyte is poured into the cell. In our experiments we used various electrolytes involving chloride, sulphate, and sulphide radicals. If it is desired to measure the potentials generated as a means of comparing electrolytes, etc., a millivolt meter is included in the circuit as shown in Figure 11.

Our tests showed conclusively that under these conditions various degrees of electrolytic disintegration of the seam could be produced, depending upon such variables as:

a) Type of solder alloy employed in the seam

b) Type of metals from which the cloth was woven

c) Nature of the electrolyte

d) Temperature at which cell was held during the duration of test

e) Degree of aeration present, agitation, etc.

f) Duration of the exposure of samples to cell conditions.

It will be seen by comparison of these six variables that they roughly parallel the circumstances which, from paper mill experience, are typical of the conditions under which electrolytic seam corrosion has been reported to occur.

As further material evidence we refer to the illustrations of Figures 12 and 13. These are macrophotographs of the same type of seam illustrated in Figure 2. In this case, however, the seams have been subjected to electrolytic corrosion in the type of laboratory cell previously described. Figure 12 shows the appearance of the seam after 18 hours of exposure at room temperature in a sodium chloride solution acidified with sulphuric acid. Here can be seen the first evidence of deterioration of the solder fillets on the warp wires. The boundary area has begun to break down. No failures have taken place. Figure 13 is the same specimen after 32 hours exposure in the same cell. Note the complete rupture of the joint.

It is interesting to note that similar specimens placed in similar cells, but containing no external connection to complete the circuit, have shown no tendency towards galvanic deterioration as has been illustrated above.

We believe that the points illustrated herein, elementary though they may be, are of such significance as to warrant more than casual inspection. In our opinion the whole subject deserves further consideration by both the manufacturers of wire cloth and the paper mills themselves. It will be quite obvious to any reader that this discussion of the problem has only scratched the surface of the real issues involved. Laboratory tests, at best, are inaccurate, and seldom actually duplicate true operating conditions in the mills. Only through constructive co-operation between paper mill and wire cloth manufacturing personnel can worth-while results be attained.

The Possible Role of Shear in Calendering

J. A. VAN den AKKER
The Institute of Paper Chemistry

▸▸▸ A WIDESPREAD BELIEF exists among papermakers in the theory that a roll-to-roll slip is responsible, in part, for the unique surface and structural characteristics imparted by the supercalender to paper. This notion has apparently been extended from the rather obvious action of the friction calender, in which the slip between one roll (of a pair) and the paper web is deliberate and pronounced. However, one of the important considerations in the development of the supercalender during the last half of the nineteenth century was reduction of energy consumption through reduction of slip.

In an interesting study conducted by Schacht and Kirchner thirty-five years ago, careful comparisons were made of the top and bottom speeds of a supercalender having nine rolls (*1*). When running at full speed with no external applied loan, an over-all speed differential of 0.285 per cent was observed; when loaded, the differential was 0.408 per cent.

More recently, measurements of top-to-bottom speed differentials have provided evidence for the absence of a roll-to-roll slip in the supercalender; the very small differentials which have been measured are attributed to elongation of the paper in the nips (*2, 3*). Even if the small speed differential is considered to be due to a roll-to-roll slip, the effect in a single nip may be shown to be trivial. Consider, as an illustration, that a speed differential of 0.5 per cent is due to slip in eight nips. The average slip per nip would be such that the ratio of the peripheral speeds of adjacent rolls should be 1.0006. If the width of the nip is of the order of 0.2 inch (*4*), one side of the paper web would be moved relative to the other side a distance of 0.00012 inch during passage through the nip. In the case of a 3-mil sheet, this distance is only four per cent of the thickness of the web. It is thus clear that a roll-to-roll slip, if such slip exists, is of trivial magnitude.

The resilient backing afforded the paper web by the paper rolls is usually considered to be the chief reason for effectiveness of the supercalender. Mention also should be made of the fact that the relatively wide nip zones in the supercalender subject the paper web to longer intervals of plastic flow; for the same "nip pressure" (pounds per linear inch of contact); a lesser maximum hydrostatic pressure would be found in a wider nip zone, but it is probable that, in the pressure range commonly employed, an increment of time of plastic flow is of more importance than an increment of pressure.

Apparently no attention has hitherto been given to the important possibility that the action of the supercalender is in large part due to the *simultaneous* application of large hydrostatic pressure *and shear stress*. This article attempts to discuss the application of Bridgman's findings concerning the effects of high hydrostatic pressure combined with shearing stress (*5*) to calendering.

The Nature of Hydrostatic and Shear Stresses

The normal application of pressure to a material (as illustrated by the compression of a slab placed between the parallel platens of a hydraulic press) is shown schematically in Figure 1 (a) and (b). The applied load is parallel to the deformation, and perpendicular to the faces to which the load is applied. The stress (or pressure) is the load applied divided by the area of either face.

Shear stress is illustrated in Figure 1 (c) and (d). When equal and opposite forces are applied to opposite faces as shown in (d), an originally cubical shape in the material *ABCD* is deformed to the shape *A'B'C'D'*. The forces are parallel to the faces to which they are applied, and the shear stress is the force applied to either face divided by the area of that face.

Pressure and shear stress usually accompany each other. A cubical shape oriented in the unstressed material as shown by the dotted figure in (a) becomes deformed as shown in (b). The change in shape is that shown in going from sketch (c) to (d); a shear stress, in which the shear force is at an angle of 45 degrees with the compressing load, is associated with the pressure stress. If the latter is *p*

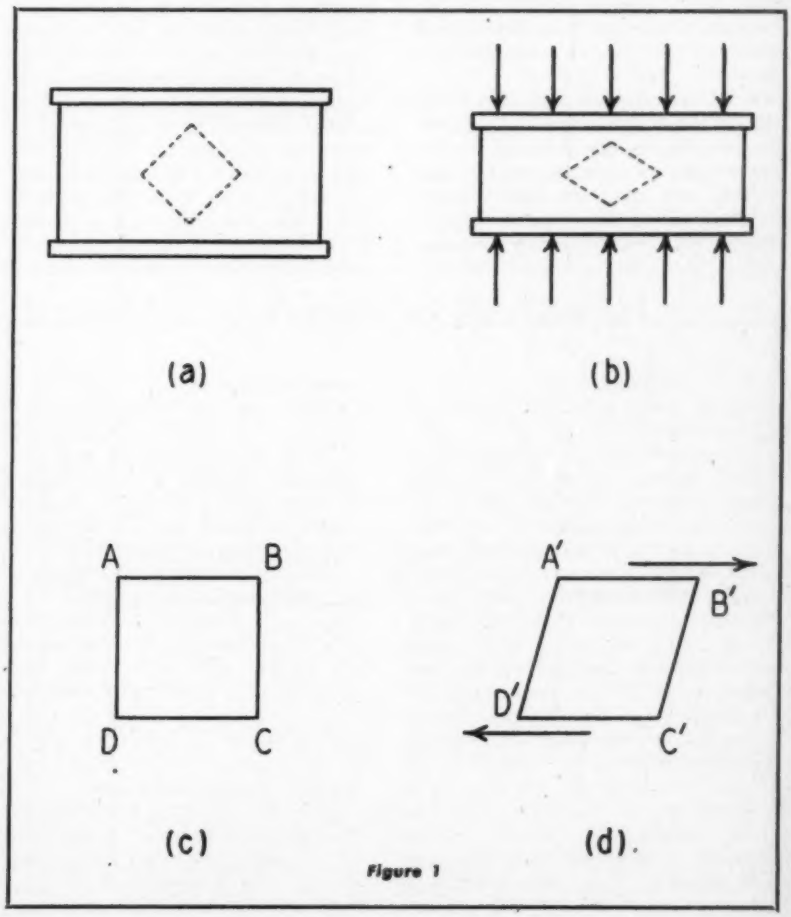


Figure 1

pounds per square inch, the associated shear stress is $p/2$ lb./sq. in.

It will be noted, on comparing sketches (c) and (d), that the application of shear stress produces an elongation of the material in the direction $D'B'$ and a compression in the direction $A'C'$. In other words, tension and compression stresses (mutually perpenedicular) are associated with the shear stress. The shear, tension, and compression stresses are numerically equal.

The Importance of the Simultaneous Application of Hydrostatic Pressure and Shear Stress

Fundamental considerations of the structure of solids led Bridgman (5) to an investigation of the effects on matter of the combination of high hydrostatic pressure and shear strain of magnitude far in excess of that associated with pressure. An idealized sketch of an arrangement which would combine pressure and shear stress is shown in Figure 2(a). The material under test is inserted between two solid cylinders of hard steel at *m*; a compressing load, *P*, is applied axially to the cylindrical anvils, and the cylinders are rotated, as shown, about their common vertical axis. The rotation produces shear stress and strain in the material under investigation.

Bridgman explains that simple anvils, as illustrated in Figure 2(a), are not suitable for high pressure, in view not suitable for high pressures, in view radially and cause the steel to split longitudinally. His actual arrangement is shown schematically in Figure 2(b). The load is applied through rather large pieces of steel to short, protruding bosses (cylindrical). An anvil, *A*, of rectangular cross section was placed between the faces of the bosses and the material under investigation separated the faces of the anvil from those of the bosses at *m*. The four faces of the steel pieces were ground plane, and accurately arranged to be aligned and parallel. A long handle, *H*, was connected to the anvil and, by applying sufficient force to the end of the handle, the operator could rotate the anvil, thereby applying shear stress and strain to the material at *m*.

The pressures applied ranged up to 50,000 kg./sq. cm. (710,000 lb./sq. in.). High pressure, combined with shear, produced unique phenomena, and drastic modifications of the structures of substances. Celluloid, for example, exploded violently, and a number of inorganic substances, ordinarily considered stable, also detonated; many of the explosions were sufficiently violent to blow off the edges of the steel bosses. Of particular interest to our discussion were the modifications observed in organic substances. Bridgman reasoned that ". . . if the atoms or molecules could be forced to slide over each other by a shear they might take up new positions which they would be less likely to assume under the uniform distortion of a hydrostatic pressure." Permanent changes were not found in substances in which the atomic forces were large. "It then suggested itself that substances in which the molecular and atomic forces are not as intense as in sulphur and carbon, as in the more loosely knit organic compounds, might show permanent changes; the first substance tried was rubber. Positive results were at once obtained; rubber is derubberized to a hard translucent material, not unlike horn in appearance. Paper was also transformed into a translucent horn-like mass. *By control experiments it was established that the paper was not transformed by the action of a pure hydrostatic pressure of 50,000, but the rotation was necessary for the effect.*"

The highest pressures used in Bridgman's experiments were, of course, a few orders of magnitude above the highest estimated hydrostatic pressures obtaining in the supercalendering of paper. The effect on paper observed by Bridgman represents the ultimate in calendering.

We may now return to our principal consideration: If shear exists in the nips of a supercalender, the simultaneous action of hydrostatic pressure and shear stress may account, in part, for the unique effects of the supercalender.

Stresses Existing in the Nip of a Supercalender

No data on the peak pressures produced in a calender nip have been published. Only rough estimates of average pressure seem possible at this time. The quotient of nip pressure (pounds per *linear* inch) and estimated nip zone width yields an estimate of average hydrostatic pressure, and Strachan, employing this means, has arrived at figures for different calendering conditions varying from a few to many thousand pounds per square inch (4).

It seems very likely that the paper web should experience appreciable shear stress and strain on passing through a nip in a supercalender. It has been shown that shear due to a roll-to-roll slip is trivial. There is, however, another source of shearing action, which may be discussed with the help of the sketch given in Figure 3. A steel roll bearing against a paper roll deforms the latter rather appreciably. (Unfortunate evidence for the deep-seated nature of the deformation is frequently found in the internal charring of paper rolls. Such charring may be found at a depth of about a half inch, where heat developed through mechanical hysteresis cannot dissipate as readily as heat developed in layers near the surface of the roll.) The deformation of the surface of a paper roll must be accomplished by *local* differences in surface velocity, and such differences in velocity must subject the paper web to shear stress.

An exact statement regarding the surface strains in a paper roll cannot be made until suitable experimental

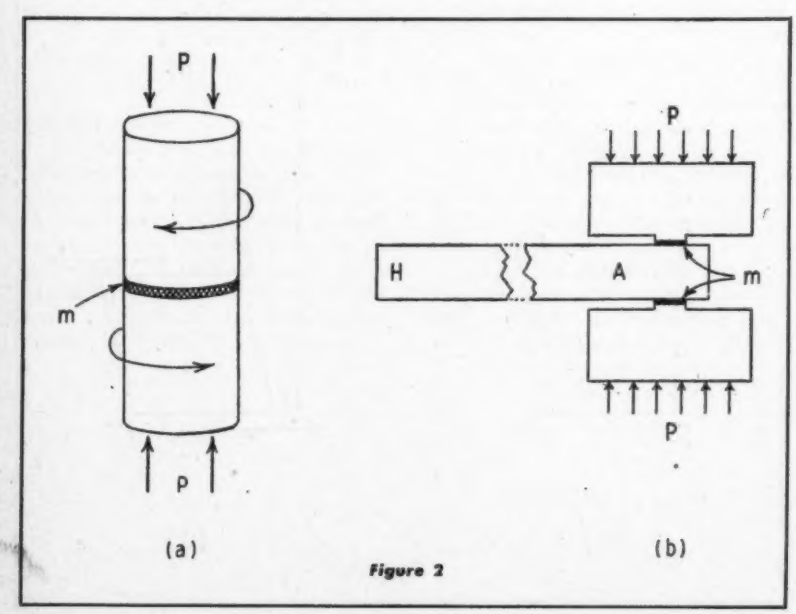


Figure 2

observations are made with an arrangement simulating conditions of loading, surface velocity, etc. However, for the purposes of estimation, it seems reasonable to suppose that the tangential strains at *A* and *B* (Figure 3) may differ by 0.02. If the width of the nip zone is ¼ inch, the relative movement between the surfaces of the steel and paper rolls, *resulting from strain differential alone*, would be 0.0025 inch in the travel from *A* to *B*. The shear strain produced in the paper web would be dependent on the thickness of the paper web, being larger for thinner webs, but in all papers of ordinary thickness, the shear strain would be very large. As an illustration, consider the case of a web of thickness 0.003 inch in the nip. The shear strain would be 0.83, which is very great. In the absence of the consolidating influence of a high hydrostatic pressure, most solids fail when subjected to a shear strain of the order of 0.01. If the guess of 0.02 tangential strain differential occurring between points *A* and *B* proved to be too large (although it appears to be a reasonable figure), it could be reduced many fold and still result in the production of large shear strain in the paper web.

It is thus seen that conditions for the Bridgman effect, on a lesser scale, obtain in the nips of the supercalender, and it seems possible that the combination of hydrostatic pressure and shear stress is responsible for such effects as the high finish imparted to coated paper and the profound modification of structure of glassine paper, resulting in a sheet of good transparency. In the latter case, the fibers and fibrous debris are so completely bonded together that optical contact is established between the particles, and a sheet of very low optical scattering power is obtained. As is well known, increased moisture content of the paper web facilitates plastic flow in the nips and, in the case of glassine paper, a translucent product is obtained through elevated moisture content, as well as by intensive beating of the furnish—at a level of stresses far below that employed by Bridgman.

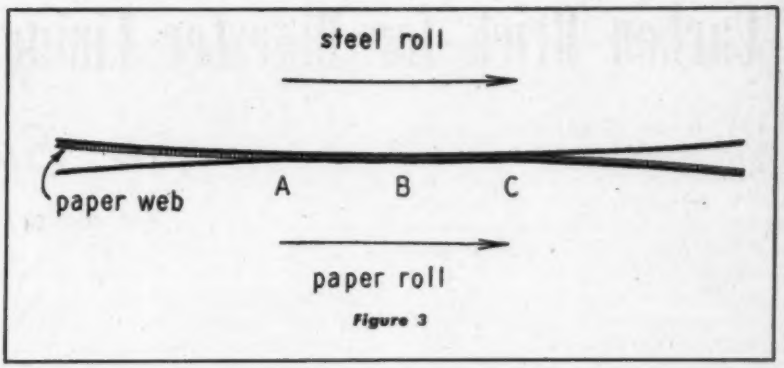


Figure 3

The discussion presented in this article is speculative, and the writer hopes that any shortcomings of speculation may be offset by stimulation of thinking on the fundamentals of the calendering process.

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Army Needs Scientific and Technical Personnel

Calling for continued War Department leadership in scientific research and development, Robert P. Patterson, Secretary of War, emphatically stated recently the War Department's policy of "pursuing a vigorous and comprehensive technological program to assure security beyond any question of doubt."

Planning will be done by the War Department Committee on Scientific Personnel, a recently created committee whose first report stressed the need for a strong policy. Reporting directly to the Secretary of War, it is composed of fifteen military and civilian research men in the War Department.

The committee has been established to make recommendations for the "development of a strong and effective scientific and technical staff" for the postwar Army. The first report has been issued after comprehensive study in the various War Department components to determine the status of professional personnel.

Further studies will be made in such areas as recruitment, selection, retention, classification and wage administration, improvement in service, advancement and recognition of personnel in the professional fields.

As the committee progresses with its work, definite programs will be developed to implement the War Department policy. The full text of the statement by Secretary Patterson is as follows:

"One of the principal lessons learned from the recent war is that the security of our nation depends upon the maintenance of a position of positive leadership in scientific research and development and their timely application to military problems. In the current transition period it is necessary for the War Department to restate emphatically its policy of pursuing a vigorous and comprehensive technological program to assure security beyond any question of doubt.

"To this end it is desired that every effort be made to stabilize and integrate research and development programs bearing on national security and to study continuously the conditions and factors that are related to their effective implementation, support, and continuity. In the last analysis, the success of the War Department research and development activities depends on the quality and adequacy of its scientific and technical personnel. It is therefore imperative to give particular attention to the recruitment, retention and improvement in service of such personnel to the end that stabilization and leadership are secured and maintained."

Carbon Brick for Digester Linings in Sulphate Mills

E. F. TUCKER[1] and L. C. WERKING[2]

▸▸▸ CARBON BRICK as a digester lining in sulphate mills has received increasing attention during the past five years, and with wartime restrictions now removed, the production, in quantity, of carbon brick for paper mill use is again possible. A review of the advantages of carbon brick in sulphate digesters might, therefore, be helpful to the industry.

The steps leading to the demand for carbon digester linings are parallel with the steps which took place in the technical development of the kraft industry. In its original form the kraft process was presumed to be non-corrosive as to action on steel. In its simple form and with the original green liquor formulas, this was true. Ordinary steel digesters under those conditions would serve fifteen to twenty years without serious deterioration, and their life could be extended another five years or so with moderate repairs. The entire process was developed on the assumption that unlined digesters would be used for that period of time and then replaced with new steel shells.

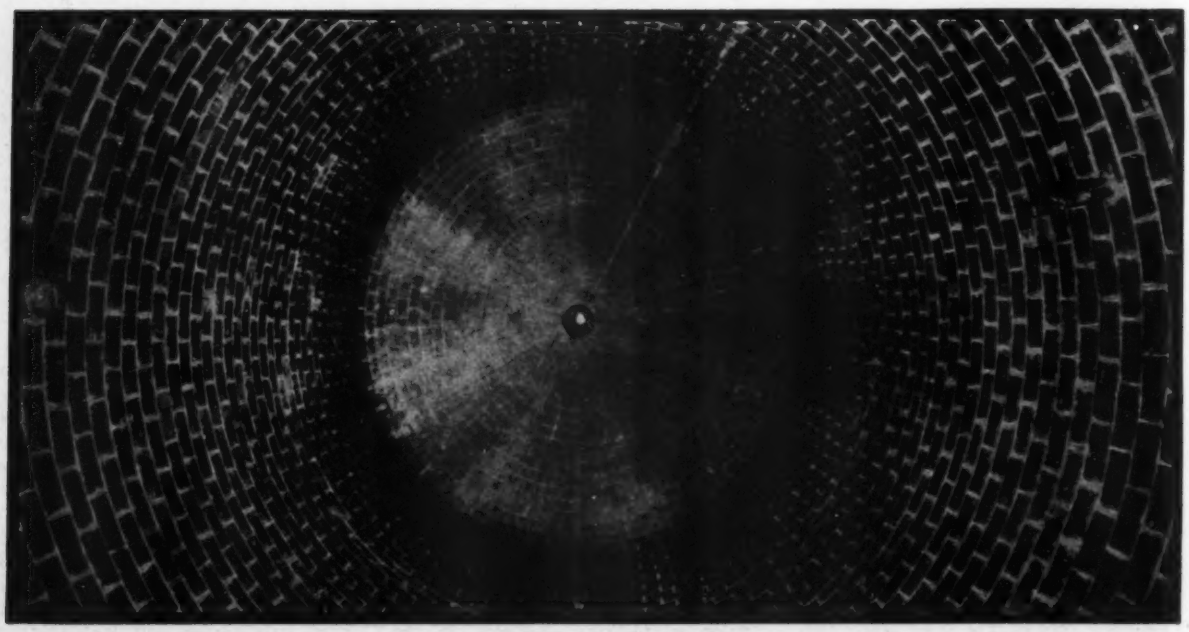
The lining problem first took form twenty-five years ago, however, when several riveted shells were erected for use as sulphate digesters. Expansion and contraction under thermal stress, as well as some electrolytic deterioration of the rivets, caused both elongation of the rivet holes and a diminution in size of the rivets—with consequent leakage through the shell. When all other attempts at correction failed, linings such as those employed for sulphite mill digesters were installed in an attempt to correct the difficulty, but in the ten-year experimental and development period which followed, it was conclusively established that brick, tile and other ceramic products would not successfully withstand the rigors of the sulphate process. Evidence shows that a ceramic lining usually lasts from eighteen months to two years before disintegration begins. The breakdown increases progressively thereafter until the lining must be completely replaced after four or five years. Meanwhile, the shell may suffer from exposure to liquor seeping through the cracks, and the pulp is contaminated with lumps of the brick or tile. Lost production time in servicing ceramic linings is also a major factor.

The first carbon lining for a kraft digester was installed approximately fifteen years ago. This one was followed by several other linings which were more or less experimental in nature and which incorporated the results of parallel research work aimed at perfecting the specifications. Nine years ago, a specification was established which incorporated all of the lessons learned in the previous six years, and the first lining installed, in accordance with the perfected specifications, is still in service and in very excellent condition. This lining is still in daily use and there has been no loss of time for lining repairs during the entire period.

In the course of the past nine years, a number of linings erected on exactly the same specifications have been installed in different mills. These are all operating successfully and are following substantially the same pattern of durability as the original.

While this experimentation with ceramic and development of carbon linings went on, the kraft process itself changed radically from the original formulas and operating conditions under which it began. Demands were made for better quality and greater quantities. As in many other industrial evolutions, the cry was for better goods and more of them. The answers

[1]Stebbins Engineering & Manufacturing Co.; [2]National Carbon Co., Inc.



View of a carbon-lined paper mill digester

A close-up view of the carbon brick lining in a sulphate mill digester

for the kraft industry lay in consideration of higher temperature and pressure operations, quicker cooks, and modified liquor formulas. Rather severe corrosion problems developed as a result of the change in formulas, with an increase in the sulphidity of the liquor acting as one of the outstanding causes of increase in the corrosion rate. In the corrosion cycle this increased wear and tear on the shell was naturally bound to shorten its life, especially since the change in liquor formulas ran parallel with increased pressure and temperature.

A comparison between the formulas employed twenty-five years ago and a typical formula used today will illustrate the difference. A table of sulphate cooking liquors used in 1920 is shown in Table 1, the quantities of the various substances being expressed in grams per liter.

Now note the formula (Table 2[1]) typical of the cooking liquors employed today, bearing in mind that increased sulphidity together with increased pressure and temperature very decidedly increases the corrosive effect of the cooking liquors.

Another important factor which militated against the use of unlined digesters was the entrance of kraft pulp into the field of dissolving and nitrating pulps—where low iron content is absolutely essential and where the pickup by contact with digester walls and transfer pipes could not be tolerated.

All these factors have combined to make linings for digester shells an invaluable asset to good kraft pulp production. At the same time it has become increasingly apparent that ceramic protective linings are inadequate for the task. The best answer appears to be in the use of carbon brick for linings. Approximately a dozen such installations have been in service for periods ranging from three to fifteen years. Spalling, cracking and abrasive wear have been completely lacking in these installations, and time loss through shutdowns for repair of carbon linings has been negligible. On the basis of present operating data, every evidence points to the assumption that a life in excess of ten years can normally be expected.

National Carbon Company bricks were chosen for installation in digester linings because of their obviously favorable characteristics. They are, first of all, inert to the action of the liquors—so much so that the composition of the liquors can be greatly varied when a carbon lining is used, and the way is opened for extensive experimentation with modified cooking liquors without jeopardy to the steel shell. The use of a lining does not in any way limit increases in pressure or temperature or place any other

TABLE 1

Authority	Na_2CO_3	NaOH	Na_2S	Na_2SO_3	Na_2SO_4	Deg. Bé
M. Muller ...	24.00	45.00	13.00	2.00	14.00	...
Schacht	36.00	80.60	13.50	7.25	15.10	17.8
Schacht	45.05	77.80	11.25	8.19	12.18	18.5

TABLE 2

Na_2CO_3	NaOH	Na_2S	Na_2SO_3	Na_2SO_4	Deg. Bé
20-30	65-70	29-33	1-2	9-10	....

TABLE 3

Type of Brick	Strength Pounds Per Sq. In.			Electrical Resistance Ohm-in.	Maximum Safe Temp. in Air		Thermal Conductivity		Apparent Density	Approx. Weight lb. per cu. ft.
	Tensile	Crushing	Transverse		°C.	°F.	Gram-cal. per sec/cm² per° C/cm	B.t.u. per hr. per sq. ft. per °F/ft.		
Carbon (CB3)	1530	8320	3070	.0016	350	660	.0124	3.0	1.55	100
Graphite	880	3050	1750	.00036	450	840	.3475	75.0	1.56	100

limitation on the conventional operation of the process. The result is that the time cycle may be reduced and production increased without any corresponding shortening in the life of the shell.

Commercial applications and laboratory tests of carbon in many fields show it to be chemically resistant to the following typical reagents:

Acetic acid
Ammonium persulphate and Sulphuric acid
Carbon dioxide—water
Carbon monoxide—water
Chlorine, dry
Ethyl mercaptan—water
Hydrogen sulphide—water
Sodium chloride
Sodium hydroxide
Sodium hydroxide and Camphor
Sodium hydrosulphite
Sodium hydrosulphite and Hydrochloric acid
Sodium hydrosulphite and Sodium hydroxide
Sodium nitrate and Sodium carbonate
Sodium sulphate and Sulphuric acid
Stearic acid
Sulphuric acid
Sulphuric acid and Chlorine and Hydrogen chloride
Sulphurous acid

The above is not a complete list of the reagents with which carbon and graphite may be used.

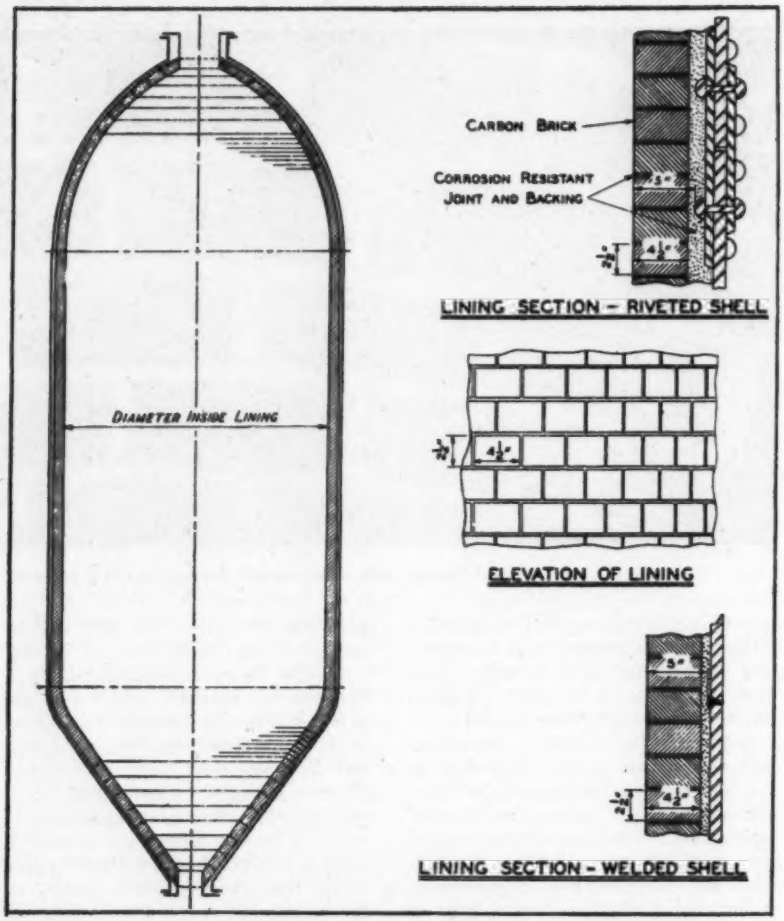
Secondly, carbon bricks are almost totally resistant to thermal shock, which means no spalling, cracking or loosening under such rapid and radical temperature changes as are present in paper mill operations. This is due in part to the unusually low coefficient of expansion of carbon or graphite which is 0.0000013 per degree Fahrenheit, or approximately one-quarter of that of cast iron.

Table 3 shows the average physical properties of carbon and graphite brick.

Thirdly, carbon bricks have an extreme resistance to abrasion, such as that involved in blowing the cook. The authors have examined bricks which have been in use in the lower cone of a digester for twelve years, and there was no measurable reduction in their thickness. The direct impingement of high velocity steam or water will gouge a carbon brick, however, and common sense must be used in placing and directing nozzles.

Finally, there is absence of any ferric or other metallic content in carbon such as might contaminate the pulp.

One of these very excellent innate characteristics of the product in itself created the only initial objection



Carbon lining for sulphate digester

to the product's use, but the problem has been successfully overcome. This difficulty was that the low coefficient of expansion of carbon bricks served to prevent the lining from following its supporting steel shell when the latter expanded from the heat of the cook. Cracks in the lining were possible under high pressure when this support was removed. This cracking under pressure due to the more rapid expansion of the supporting shell as compared with the lining, was overcome many years ago by the development of a special technique of installation and the use of a type of carbon which struck a compromise between the requirements for resistance to thermal spalling, and a too low coefficient of expansion. A special cement for bonding the bricks was also developed which proved unusually tenacious under heat and pressure and contributed to successful installations.

A secondary difficulty was a resistance on the part of mill operators to the use of a black material which they feared might shed carbon specks into the pulp, but overcoming the prejudice against carbon's appearance is simply a matter of educating the mill operators to the true nature of carbon structures. Carbon particles do not slough off into the pulp, even though this might be thought to be the case by the discoloration one's hands receive in handling a dusty brick. Carbon's high resistance to abrasion is evidence that particles are not carried off in the pulp; on the contrary, carbon brick inside the digester simply presents a virtually frictionless surface to the passage of the pulp when it is blown. For example, engineers are thoroughly familiar with the properties of low coefficient of friction and long life when using carbon piston rings or packing rings in oilless compressors; and pulp mill operators are familiar with the use of carbon packing rings in the steam joints on the dryer rolls of fourdrinier machines.

In lining the shells of new digesters, a normal inside diameter can be maintained by increasing the shell diameter slightly. Some loss of inside diameter is occasioned, however, when old kraft shells are relined with carbon. This is because all carbon digester linings

have been held to a 5-in. thickness thus far due to certain limitations on the economic manufacture of the material and by the necessity of distributing the unit stresses in the wall so that they will fall well within the limits of the strength of the carbon blocks. Constant research is in progress to develop ways and means of reducing the thickness of these linings, however, and results give promise that this is going to be accomplished. The research problem is a difficult one because of the time factor involved. The question of whether a thinner lining is going to be a 5-year or a 10-year lining, takes 5 or 10 years to answer. Nine years of operation prove that a 5-in. thickness is completely satisfactory.

In converting large existing sulphite digesters to kraft production, experiences to date are such as to indicate the need for caution in attempting to line digesters to a larger inside diameter than 12-ft. because in these greater diameters stresses are developed which may exceed the strength of carbon materials. There are indications that in greater diameters a separation of lining from shell would leave a void which would permit unfavorable reaction under the increased unit stress of the lining. The possibility of using carbon in combination with ceramic materials in order to regulate heat transfer and govern the expansion of the steel shell is well recognized. Partial success has been achieved with such combinations but proof of the advisability of making large commercial installations is still lacking. The economic aspects of this question are extremely complex.

To date, the most prominent use of carbon in the kraft industry appears to be for the type of digester linings described above. Carbon and graphite, however, are extremely adaptable materials which can be shaped, machined, drilled and fabricated so as to permit application to numerous corrosion resistant uses. They are employed for racks and grates to support packing in a number of scrubbing and absorption towers. Raschig rings of carbon have a number of specific advantages over the ceramic type. Impervious graphite heat exchangers are proving very successful for low pressure applications and their use is constantly expanding. Carbon linings considerably lighter than those used in digesters are satisfactory for the caustic treatment towers and cookers in bleach plants, and the possibility of using similar lightweight linings in liquor preparation and storage tanks may be the answer to specific problems in certain mills.

As of the release of this article, it is interesting to note that carbon linings are being manufactured and installed in eight more existing digester shells. In addition to these, four new digester shells are being fabricated for future installation, designed so as to receive carbon linings before they are placed in production.

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Aluminum Foil for Standardizing the Mullen Tester

▶▶▶ SOME YEARS AGO the Canadian Pulp and Paper Association carried out some extensive research on the possibility of using aluminum foil as a basis of standardizing the gauge of the Mullen tester. After trying various methods of approach, they developed a formula by means of which the Mullen bursting strength of a strip of foil could be accurately determined from the weight of the strip. This result is based on the fact that, unlike paper, aluminum foil which has been rolled from one batch of metal is uniform in strength of bonding and varies only with the thickness of the foil. But thickness tests are made on small spots and cannot give a really average value for the entire strip. Therefore, weight, which does represent the entire average thickness and is also convenient to use was chosen for the basis of operation. The formula which connects weight with bursting value must be calculated anew for each batch of foil.

Aluminum foil can be purchased which is fully twice as accurate as the best checking paper which can be made; also it is not affected by changes in atmospheric moisture, or by a reasonable, unavoidable crushing of the surface of the thinner foil, and it does not deteriorate with time. A supply of thin foils, each with the Mullen value marked on it, may be kept in files ready for use at any time.

In 1940 the Minor Laboratory of Springfield, Massachusetts, obtained and standardized two lots of this foil to values which were based on those of the master instrument in the hands of the manufacturer of the Mullen tester. This work was carried further than that of the Canadians in that the foil, instead of being sold in rolls, was cut into strips which had been weighed and marked with the correct Mullen value for the strip. In this way there was available to jobbers, salesmen and other non-technical men, as well as to the trained men of the larger laboratories, an accurate, convenient and quick method of checking a Mullen tester for gauge accuracy.

The strips were cut at approximately 18 inches—the length for the two thicknesses varying for formula simplicity—since this length allowed eight punches which is a convenient number for an accurate average value. In cutting the strips, after each ten, one was laid aside, weighed and tested. For the thin foils averaging around 15 points, in every case the average punched differed from the calculated value by less than one point and 90 per cent of these values were within 0.5 points of calculation. For the heavier foils testing around 40 points 90 per cent differed from the calculated by less than one per cent and none were 2 points divergent.

During the war it was not possible to replace a grade of foil as it became exhausted and also, the Minor Laboratory became a part of the Hurlbut Paper Company. But foil is now available and, since the Hurlbut Paper Company desires to have this foil available for its own use, new foil has been obtained testing around 15 points and around 40 points and this has been standardized and checked with the same care as previously and the formula has been adjusted to results. Since many requests have been coming in from former purchasers and others for this foil, at the suggestion of the laboratory, the Hurlbut Paper Company procured a sufficiently large lot of this foil to enable them to supply these standard strips for general use.

The Hurlbut Paper Company (South Lee, Mass.) is glad to give this service to the paper industry and will supply standardized strips at the original price.

Cleaning Windings of Electrical Equipment

D. L. GIBSON, Insulation Engineer*
Westinghouse Electric Corporation

▸▸▸ THERE ARE SEVERAL rather simple methods that can be used for cleaning windings, rotors and stators of electrical equipment and the one, or combination to use depends upon the reason for cleaning the machine. Cleaning of apparatus and insulation goes beyond simply wiping off the surface with solvent; or removing old coils and scraping the slots free of varnish. Money, time, and labor can be saved on cleaning and on subsequent operations if the jobs are analyzed and proper methods used.

Machines which are being rehabilitated by another varnish and oven-bake dip require a type of cleaning that will remove grease, dirt and carbon dust, but not damage the insulation. Then for stators or rotors which are to have the coils removed and then rewound, a method can be used that not only eliminates dirt and grease, but also softens the varnish film to facilitate removal of coils, cleaning of vent ducts, and of frames. Proper cleaning of laminations and slots can be achieved by still another method. In some cases machines may require special cleaning with water or solvents due to exposure to chemical fumes, salt water, or flood waters.

These examples indicate the need for careful analysis of the cleaning problem and of then making provision for facilities to do the job economically. Usually, adequate temporary equipment can be installed to take care of the special cleaning necessary.

Standard methods of cleaning insulation include: wiping the parts with lintless cloths soaked with solvent; blowing the dirt out with air pressure; drawing the dirt off with vacuum cleaning apparatus; spraying or immersing in solvents; and washing with water. Specialized methods include the use of vapor degreasing and the use of the steam "jenny." The methods used will depend upon the varnish treatment of the apparatus and conditions involved.

Machines treated with asphalt base varnishes cannot be cleaned by vapor degreasing unless complete stripping and removal of varnish is contemplated. Low-powered solvents should be used on asphalt base varnishes if the film is not to be removed. Synthetic varnishes will stand more severe cleaning methods than asphalt varnishes without injury to the film.

Cores stripped for rewinding may be further cleaned by sand blasting, vapor degreasing or solvent immersion. This discussion applies to machines that may be dismantled to be cleaned or machines that can be taken to repair shops for an overhaul. The following methods do not apply to high voltage machines of 4,000 volts and over. These require special cleaning processes with low-powered solvents.

Blowing Out And Drawing Off Dirt

Blowing out dirt with air at about 40 to 50 pounds pressure is usually effective, particularly in inaccessible places as illustrated in Figure 1. However, use of air merely removes the loose dirt, and does not disturb the embedded material. Cleaning can be done quickly with compressed air, however, the air should be dry and clean; the windings should not receive the full force of the air pressure. Equipment to be cleaned should be given a preliminary going over with air pressure to remove the loose dirt. Care should be exercised in using air, however, to prevent blowing dirt into cracks in the insulation. If vacuum cleaning equipment is available it should be used as it does a good cleaning job and in addition does not distribute the dirt around the shop.

Use of Solvents

When the accumulation of dirt on the frame and insulation contains oil and grease, an organic solvent will be required to remove it as shown in Figure 2. Solvents for oil and grease can be applied by wiping with lintless cloths moistened with the cleaning fluid. Obviously, this method cleans only the readily accessible places. Pressure spraying or immersing the parts in a bath of the solvent reaches the inaccessible parts. The immersion method entails some hazard caused by the maintenance of tanks of solvent. However, small motors can be easily cleaned by hanging on racks and dipping in solvents.

*Development Insulation Section, Transportation and Generator Division, East Pittsburgh, Pa.

Fig. 1 (left)—Removing loose dirt from rotor winding with compressed air. Air pressure should be kept between 40 to 50 pounds, otherwise there is danger of loosening insulation material. . . . Fig. 2 (right)—Cleaning grease, oil metal chips and dirt particles from a slotted rotor with solvent. Note brush used to insure complete removal of contamination within slots

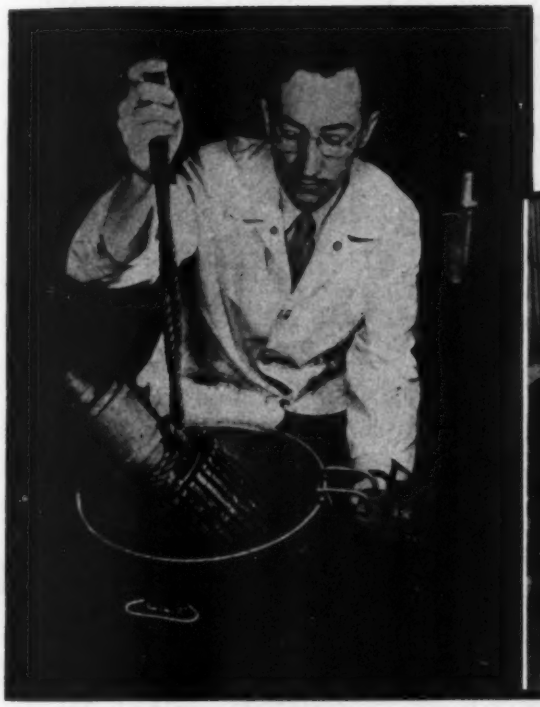

Fig. 3 (left)—Cleaning slotted rotor and commutator of small motor by vapor degreasing method. An electrical emersion heater raises the temperature of the cleaning solvent, trichlorethylene, to the vaporization point only. Cleaning action results from condensing of hot solvent vapors which washes off dirt and grease

Fig. 5 (below)—Sanitation demands continuous washing of equipment with boiling water and compressed air; though not ordinary motors. These must be of totally-enclosed types before it is safe to try to clean them as shown

These methods adequately clean the surface of the machine for repairs, or of the insulation for additional varnish treatment or for removal of a few coils. They do not clean out vent ducts, dissolve varnish, loosen coils in the slots, or clean slot laminations. The baked varnish film is rarely injured.

In general there are three types of organic solvents in use, for cleaning:

1) Petroleum distillates of low solvency power, such as, mineral spirits or a high flash dry cleaning solvent known as Stoddard's Solvent, or Cleaner's Naphtha.

2) Petroleum distillates of a medium solvency power; such as, naphthenic mineral spirits.

3) Carbon tetrachloride.

Typical analyses of several petroleum cuts are given in Table 1. Solvents are purchased to such specifications. Those for cleaning purposes should have flash points of approximately 100 Fahr. or greater and a solvency power (kauri-butanol value) in the range of 30-45. Such solvents are inexpensive. They evaporate leaving little or no residue. It should be remembered that high flash point solvents minimize the fire hazard, but they are inflammable. The necessary precautions and facilities should be provided for storing flammable liquids. Usually, insurance regulations provide adequate instructions for storage of solvents.

Petroleum solvents are the least toxic but ample ventilation should be furnished, as should the necessary fire precautions. Carbon tetrachloride is non-inflammable, but extremely toxic, and of very high solvency power. This should be used only when a very severe dirt condition is encountered, and then only with special health precautions. In some cases, carbon tetrachloride is mixed with the petroleum solvents to increase their cleaning power, and decrease the fire hazard. A mixture of 50 per cent carbon tetrachloride and 50 per cent mineral spirits is non-inflammable, but the vapors mixed with the right proportions of air are explosive. In no case should alcohols, bensol, or toluol be used. They are severe, will dissolve or soften the varnish present, are extremely toxic, and are fire hazards. Petroleum distillates of low solvency power will not attack the baked varnish films present but will dissolve oil, grease and loosen dirt. Some air drying varnish films will be softened by petroleum solvents.

Vapor Degreasing Method

For some years the metal finishing or process shops have utilized vapor degreasing tanks for cleaning surfaces prior to further handling or finishing with enamel or paint. This method utilizes the principle of condensing hot solvent vapors on the metal to be

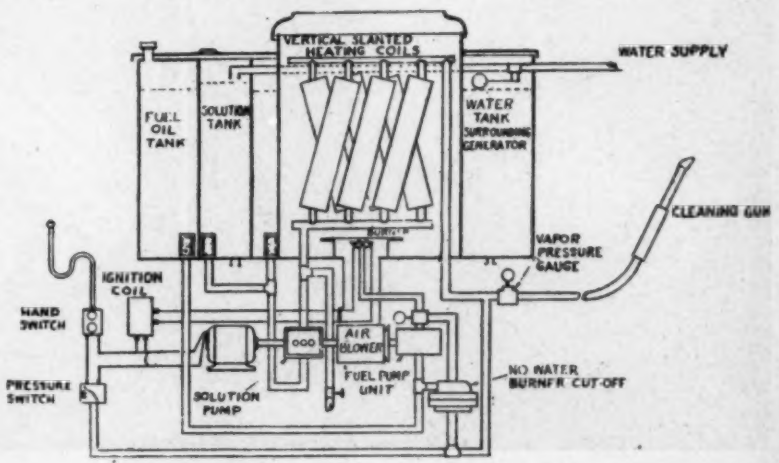

Fig. 4—Typical arrangement of a steam "Jenny" that is used to clean surfaces with hot water under pressure

cleaned, which washes off the grease and dirt, through a continuous condensing process as shown in Figure 3. The washing solvent is always clean, since it condenses on the surface from a vapor. Solvents used are high boiling, toxic, non-inflammable, chlorinated compounds called trichlorethylene and perchlorethylene. Sold under various trade names, these compounds are brothers to carbon tetrachloride, and are known to the chemist as unsaturated compounds. The degree of unsaturation or double bond indicates chemical activity, the chlorine atom gives high solvency to the molecule, as well as non-inflammability. This combination gives a material which attacks or dissolves greases, oil, dirt, enamels and varnish films, and many organic chemicals. However, these solvents have no dissolving effect on shellac and some organic enamel finishes. Trichlorethylene boils at 87 C. (188 Fahr.), while perchlorethylene boils at 121 C. (250 Fahr.).

Such principles may be adapted to clean wound cores or other equipment where all the coils are to be removed, or where equipment is to be rewound, vents and metal thoroughly cleaned. The hot vapors condensing on the equipment, attack the dirt, grease, and varnish film. The solvent softens and dissolves the varnish around the coils so that stripping is accomplished easily, and laminations are not damaged on coil removal. If slots and laminations are to be further cleaned, the core may be returned after stripping for another cleaning cycle. This method is not to be recommended where only the insulation surface is to be cleaned and the wound core given a coat of varnish and baked. Some use has been made of the process for surface cleaning, where the machine has been treated with certain synthetic varnishes, and careful control is exercised in the degreasing process. However, the control must be precise, so that the vapors will not soften the varnish film.

Table 1—Specifications for Standard Petroleum Solvents

Values	Xylene Substitute	Mineral Spirits	Naphthenic Mineral Spirits	High Flash Mineral Spirits
Sp. gr. at 15.5 deg. C.	0.77–0.80	0.76–0.79	0.81–0.82	0.77–0.79
Pounds/gallon	6.4–6.7	6.3–6.6	6.7–6.8	6.4–6.6
A.S.T.M. Distillation (deg. Fahr.)				
Initial B.P.	290	305	310	325
50% over	305	345	340	350
90% over	315	370	370	370
Dry point	325	395	395	395
Kauri-Butanol Value	36–47	31–40	42–46	34–36
A.S.T.M. Flash Point (deg. Fahr.)	85	103	105	115

The degreasing process is carried out in a tank, heated by steam or gas, and provided with cooling coils, on the inner walls. There are patented degreasing chambers on the market, which are furnished and installed by companies specializing in this method. In this operation, the cleaning solvent is brought to vaporization or boiling. Then the vapor rises to the condensing coils, located near the top of the chamber. The apparatus to be cleaned is lowered below the vapor line into the vapor, which condenses immediately in a steady stream on the piece. When equipment reaches the temperature of the vapor, condensation stops and the cleaning process is completed.

Cleaning by Use of Steam "Jenny"

Some success has been achieved in surface cleaning by use of hot water under pressure. Portable steam "jennies" are available with special jet guns and nozzles to eject hot water vapor at 60 to 70 pounds (nozzle pressure). Such a device, outlined in Figure 4, heats flowing water and ejects it in vapor form through a cleaning gun or nozzle under presssure. This method is efficient particularly for removal of dirt, dust, mud, or chemicals. Attachments are available to feed so-called neutral soaps or solvents into the vapor stream. The soap emulsifies grease or oils present and makes them easily removable. The use of strong alkali soaps should be avoided due to their injury to varnish films and the danger of leaving conducting particles on the insulation. The temperature of the water or soap solution should not be above 90 C (194 Fahr.), and the pressure at the windings not over 25 pounds per square inch. Neutral soaps have little effect on the baked varnish film and insulation, however, the operation should be completed by a rinse in warm, clean water. This method is not an aid in coil removal, but cleans the surfaces for further repair, or varnish treatment.

Cleaning by Immersion in Water

Electrical apparatus which has been in flood waters, and is clogged with silt and mud (Figure 6) or equipment

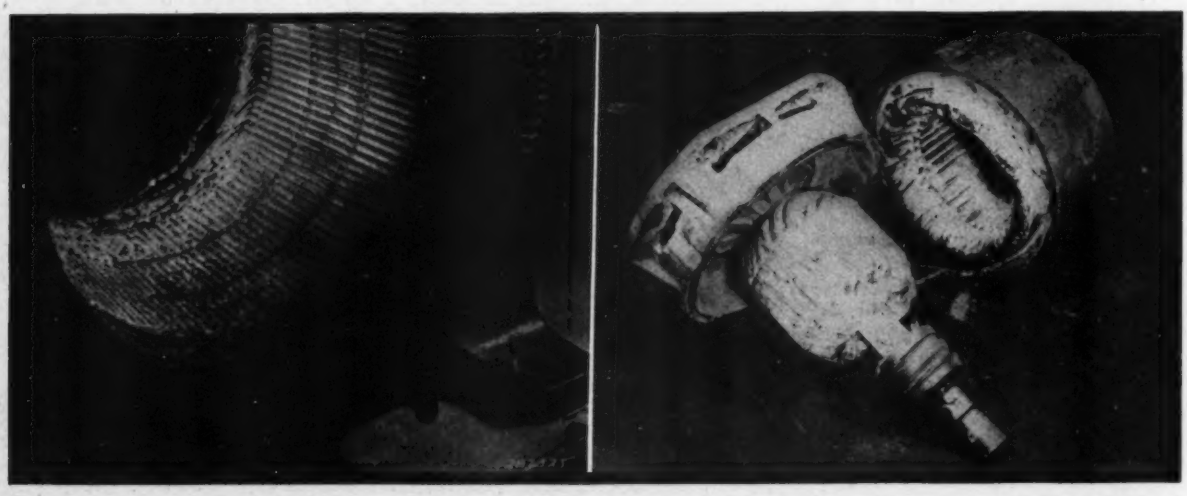

Fig. 6 (left)—Dirt accumulation in stator as result of being immersed during a flood. The thickest layers can be removed by immersion in warm running water and then using a brush. . . . Fig. 7 (right)—Contamination of stator and rotor of small motor that had been used in a chemical plant. Running warm water and a brush will quickly remove the heaviest layers of dirt and dust

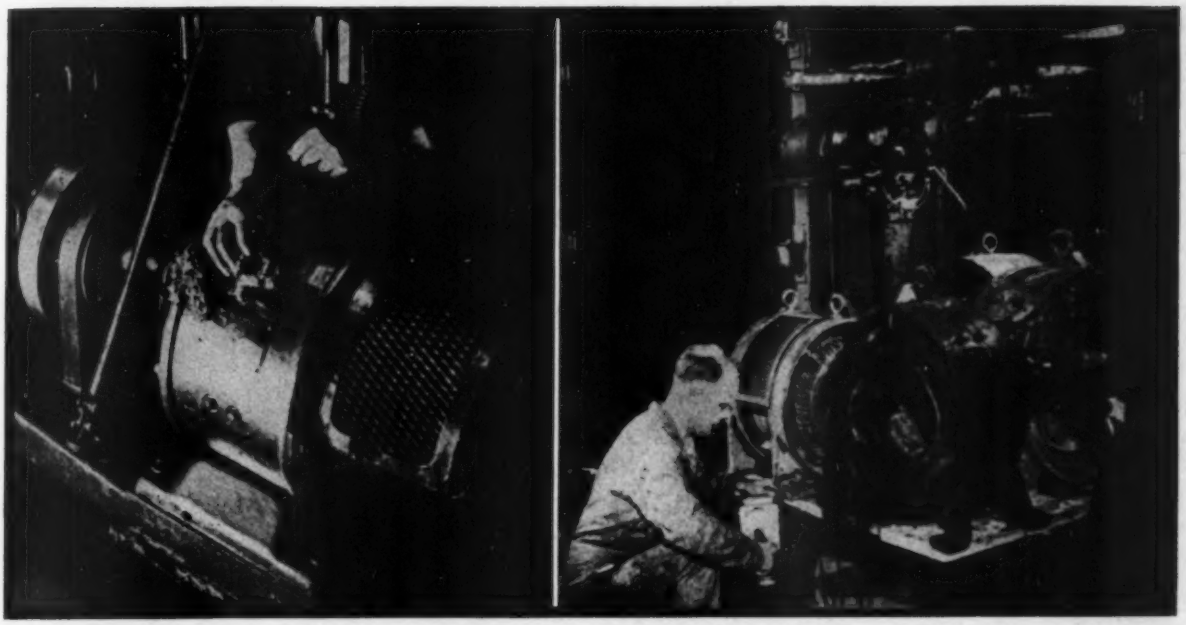

Fig. 8 (left)—Regular wiping off of the motor will do much toward keeping it in first class shape. This should be an essential part of plant housekeeping program. . . . Fig. 9 (right)—Measuring insulation resistance of stator windings during baking out. This is essential test procedure at this point as it indicates condition of insulation

exposed to water soluble chemicals (Figure 7), probably needs to be cleaned by immersion in water. Some chemicals to which modern electrical machinery is exposed are soluble in water, and become embedded in grease as a hygroscopic slime. These can best be cleaned by immersing the dismantled parts in running water at 52-57 C. (125-135 Fahr.), scrubbing the metal with brushes and wiping the insulation with lintless rags. After water immersion the machines or parts may be given additional cleaning with a steam "jenny."

With any process where water is used on electrical windings care must be taken to dry out the equipment slowly so as not to damage the insulation by formation of steam. There are three methods of drying winding insulation:

(1) Internal Heat

(2) External Heat

(3) Combination of Internal and External Heat

Shops where electrical machinery is maintained and repaired should have a forced draft ventilated oven capable of reaching 135 C. (275 Fahr.). This could be used for baking of varnish and the drying of machinery after cleaning with solvent or water. When water has been used for cleaning it is preferable to dry the windings in an oven. Regardless of the heating method used it is recommended usually to limit the first bake to a maximum of 75 C. (167 Fahr.) on the windings, and to raise the temperature slowly to 110 C. (230 Fahr.), maximum for Class A windings and to 130 C. (266 Fahr.), maximum for Class B windings. Frequent insulation resistance readings should be made and curves plotted for future reference, in order to standardize bakes for certain classes and types of machines. The drying time necessary is controlled by the size of the machine, and the heating methods used, as well as the condition of the windings.

Cleaning Cores

Cores can be further cleaned after the coils have been removed by use of a blast of fine sand, applied under pressure. Slots can be cleaned in this manner preparatory to rewinding. However, the operation has to be controlled carefully, in order not to burr laminations, or remove steel from the punchings. There is some question as to the effect on core losses, but there are reports that this method is being used on certain types of cores. The cleaning is carried out by a blast of sand directed through a hand gun at 75 to 85 pounds pressure (at the nozzle). Cores to be cleaned are placed on a special revolving platform which contains hoppers for the sand. All sand is screened automatically before re-use. By means of the hand gun the blast in the slots is directed parallel to the length of the core. Such a method thoroughly cleans all recesses.

Conclusions

It is not advocated that facilities for such diversity of methods be kept available. However, apparatus to be cleaned should be analyzed thoroughly and the proper methods used to remove the type of contamination. Considerable thought should be given to the type of dirt and foreign matter present. It may be possible that a majority of equipment to be cleaned falls within a certain category, and a suitable method can be installed to speed the process. Use of proper cleaning methods can save money, time, and labor.

Paper SKETCHES . . . . . .

ORNAMENTS OF PAPER WERE USED IN ENGLAND IN THE 1870's TO DECORATE STOVES!
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The success of such new applications is assured by the remarkable performance of wet strength paper in wartime maps, toweling, food wrappers, containers, shipping tags, and field note books. Wet strength paper has also come into its own in the manufacture of absorbent papers, bag and sack papers, saturating papers, photographic papers, poster papers, twisting papers, and wrappings.

PAREZ 607 can be added directly to the fiber finish during paper manufacture. It serves to bind the fibers together with a bond that is insoluble in water and most other liquids. As the paper comes off the machine, tests reveal outstanding improvements in bursting and tensile strength, along with a pronounced increase in folding endurance. Furthermore, PAREZ bonding does not adversely affect such properties of paper as color, opacity, or surface characteristics.

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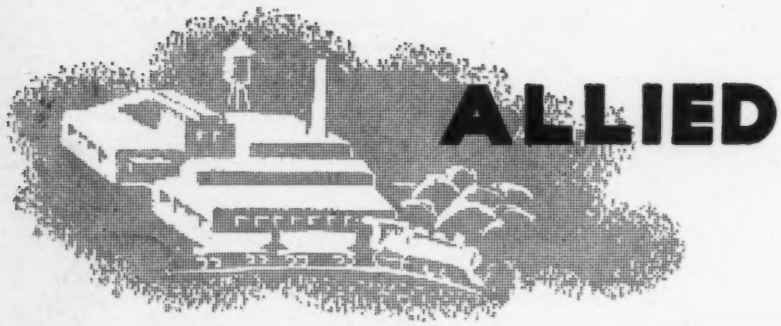


PRES. FRED BOYCE READS REPORT AT D. J. MURRAY STOCKHOLDERS' MEETING

At the recent meeting of stockholders of D. J. Murray Manufacturing Company, Wausau, Wisconsin, F. C. Boyce, president of the company, gave a report showing great progress in manufacturing and diversification in products with the introduction of several new items and expansion of its market on a nation-wide and export basis. In his review of the past 25 years of the company's present directorate, President Boyce compared the firm's products, markets, physical equipment and facilities in 1921 with those of 1946. Employeees in manufacturing departments have increased from 91 to 250, and in the office and engineering department from 13 to 69.

The following directors were elected: F. C. Boyce, M. P. CcCullough, C. E. Staky, J. S. Alexander, D. C. Everest, George L. Ruder, and Grover Keeth. At a directors meeting following the meeting of stockholders, the following officers were elected: President, F. C. Boyce; vice president, M. P. McCullough; executive vice president and general manager, C. E. Staky; treasurer, J. S. Alexander; secretary and assistant manager, A. W. Plier.

◆

▶▶▶ A CHANGE OF NAME became effective the first of this year for the company formerly known as Johnson & Wierk, Inc., New York City. The firm is now known as Alvin H. Johnson & Co., Inc., 415 Lexington Avenue, New York 17, N. Y.

◆

MATHIESON TO BUILD PILOT PLANT AT NIAGARA FALLS

In line with its program of expanding production and research facilities, The Mathieson Alkali Works (Inc.) is about to build a new pilot plant at Niagara Falls, New York.

The pilot plant, which will be the second recent addition to the company's facilities at Niagara Falls, will cost an estimated $150,000. Completion of another plant in that city, for increased production of sodium chlorite, was announced last September.

With a view to increased co-ordination between research, sales development, and plant operations, Mathieson's research department was organized recently with G. P. Vincent as technical director.

◆

▶▶▶ A NEW RESIN, which, when reinforced with glass fabric, provides a composition about twice as strong as some types of steel, on a pound-for-pound basis, has been announced by E. I. du Pont de Nemours & Company. This new material—known now only as du Pont BCM—has excellent bonding properties and high resistance to heat. Preliminary tests indicate burn marks from lighted cigarettes and matches to be "practically negligible" on veneer surfaces coated with the resin.

◆

PENN. SALT PRESIDENT AND ASST. ON VISIT TO EUROPE

President Leonard T. Beale, and his assistant, Richard L. Davies, of the Pennsylvania Salt Manufacturing Company, Philadelphia, sailed recently for a one-month visit in Europe where they will discuss the resumption of business relationships with chemical companies in England, France, and Denmark.

The main object of the trip, as stated by Mr. Beal, is to visit Copenhagen and renew the long friendship with the cryolite company. The Pennsylvania Salt Manufacturing Company has been buying cryolite ore from Copenhagen since 1865, and shipments have been made each year, even without interruption during the war period. Another important object of the trip is to establish close relationship between certain friendly English and French chemical companies.

◆

HARRIS-SEYBOLD CO. IS NEW NAME OF H-S-P CO.

As a special meeting of company stockholders on March 28, the name of the Harris-Seybold-Potter Company, Cleveland, was changed to Harris-Seybold Company.

L. P. Wasserman, New York City, was added to the board of directors. The stockholders also approved revised by-laws and fixed the authorized number of directors at ten. Mr. Wasserman is a partner in the New York firm which has been legal counsel for Harris Seybold for more than 20 years.

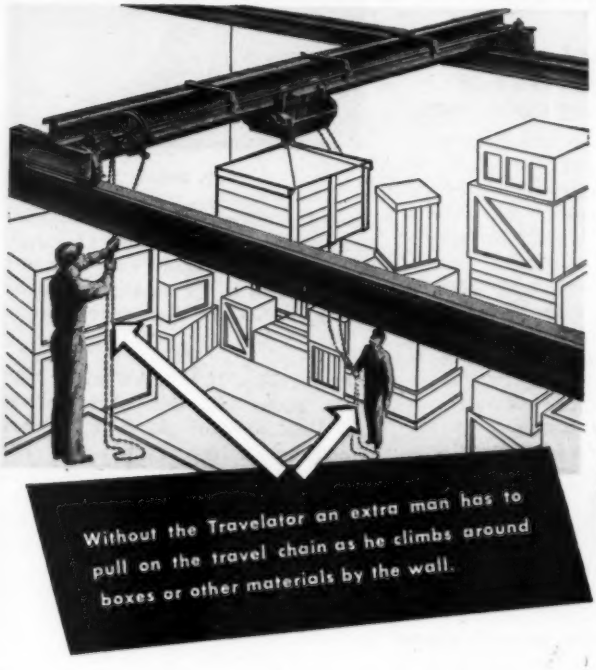
◆

▶▶▶ NEW REPRESENTATIVES on the Pacific Coast are announced by the Flexible Steel Lacing Company, of Chicago. Richard Y. Dakin and Morris B. Miller, Dakin & Miller Company, 124 West Fourth Street, Los Angeles 13, are covering California; and E. R. Spragg and G. G. Spragg of E. R. Spragg & Son, 4012 East 38th Street,

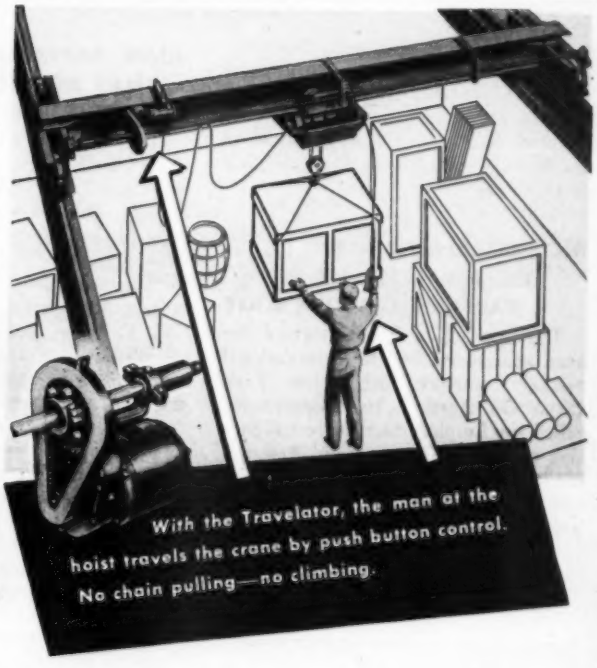
Sales and service engineers of Dicalite Company, New York City, attended a sales and technical conference at Hotel Roosevelt, in New York, during Paper Week (February 21 to 23), where plans were laid for still greater expansion of service to industrial users of diatomaceous materials. Seated at far right is A. G. Frankenhoff, vice president and sales manager; fourth from right, W. R. Monette, western division manager; fifth from right, H. L. Dunham, eastern division manager. Standing, third from right, is Dr. A. R. Bollaert, technical director

YOU DON'T NEED "PULL" IF YOU HAVE A *Northern* TRAVELATOR

MOTOR TRAVEL FOR HAND TRAVELED CRANES



Without the Travelator an extra man has to pull on the travel chain as he climbs around boxes or other materials by the wall.



With the Travelator, the man at the hoist travels the crane by push button control. No chain pulling—no climbing.

The Patented Northern Travelator eliminates the "pull" in hand traveled cranes—provides electric motor power travel with pendant push button control.

It provides faster, easier operation—makes the crane far more serviceable and satisfactory.

And—it's economical to buy—very easy to erect. Any good mechanic can apply it to your crane in less than half a day. No part of the crane is removed or dismantled, except the pull chain.

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Seattle 5, are covering Washington and Oregon. Stocks of products will not be carried by these sales representatives, but both organizations will work in close harmony with each other and with Flexible's stock-carrying jobbers.

◆

ACME STEEL ACQUIRES MORRISON WIRE STITCHER FROM HARRIS-SEYBOLD CO.

All interests in the Morrison wire stitcher business formerly owned by Harris-Seybold Company, Cleveland, is now the property of Acme Steel Company, of Chicago.

Harris-Seybold will continue to service Morrison equipment until arrangements have been completed for Acme Steel to absorb the Morrison service system. The shift will be accomplished without confusion, since Acme Steel has branch offices and warehouses in all cities where Harris-Seybold offices are located and has ample production facilities for continuing the manufacture of the Morrison line of machines.

◆

INCO ESTABLISHES NEW TECHNICAL SERVICE IN PART OF NEW YORK STATE

The opening of a new service has been announced by the International Nickel Company, Inc., New York City. On April 1, this department, called the Empire State Technical Section of its Development and Research Division, was introduced to furnish technical information and assistance to industry in the state of New York, excluding New York City, the Albany area, and the Hudson River Valley.

Gilbert L. Cox, metallurgical and chemical engineer, will be in charge. He has been associated with International Nickel since 1931, serving in various capacities in its Development and Research Division. He returned to International Nickel the first of this year, having been on active duty with the U. S. Army Ordnance Department during the war years.

◆

▶▶▶ THE FIRST ISSUE of company publication *The Waldron Window* was published in March by John Waldron Corporation, New Brunswick, New Jersey. The cover of No. 1, Vol. 1, carries a fine illustration of Waldron's testing apparatus. Through "The Window" the company expects to point out many interesting and valuable things to its customers, employees, and associated readers.

◆

AMER. BRAKE SHOE CO. MAY ACQUIRE PLANT OF PROGRESSIVE FDRY. WKS.

The American Brake Shoe Company, New York City, has contracted to purchase the Progressive Foundry Works, Inc., Rochester, New York, subject to approval of Progressive's stockholders.

The new plant will be operated as a new division under the direction of W. T. Kelly, Jr., president of Brake Shoe's Kellogg Division. Howard S. Van Billiard, president of Progressive Foundry, will remain as manager, and no change in the personnel of the eighty-one employees is contemplated.

Brake Shoe plans to continue to produce castings for Progressive's old customers in addition to introducnig castings made by the process recently developed at Brake Shoe's metallurgical research laboratory.

A sixty-year Pioneer Club Pin is presented to C. A. Newport (right) by Elias C. Atkins, president of E. C. Atkins and Company, Indianapolis, Indiana, at the recent annual banquet of the Club. Edwin W. Clark also received a sixty-year pin. The Club is composed of employees who have served twenty years or more, and numbers 450

▶▶▶ A SPECIAL DEPARTMENT to handle problems of industrial waste and stream pollution has been established by Hall Laboratories, Inc., Pittsburgh. The new department will be

C. F. Hauck

headed by Charles F. Hauck, until recently engineer at Ravenna Ordnance Center, and previously senior chemist and assistant to the superintendent of Southerly Sewage Treatment Plant.

◆

▶▶▶ THE NEW LAWSON "38" paper cutter was exhibited recently at the showrooms of the E. P. Lawson Company in New York City. The cutter was demonstrated to members of the trade and press representatives. Designed by Fred Seybold, Lawson's chief engineer, the new 38-inch cutter is now in quantity production with larger sizes of standard and automatic spacing models to follow.

◆

SOUTHERN ALKALI CORP. TAKES OVER GOVT. PLANT AT LAKE CHARLES, LA.

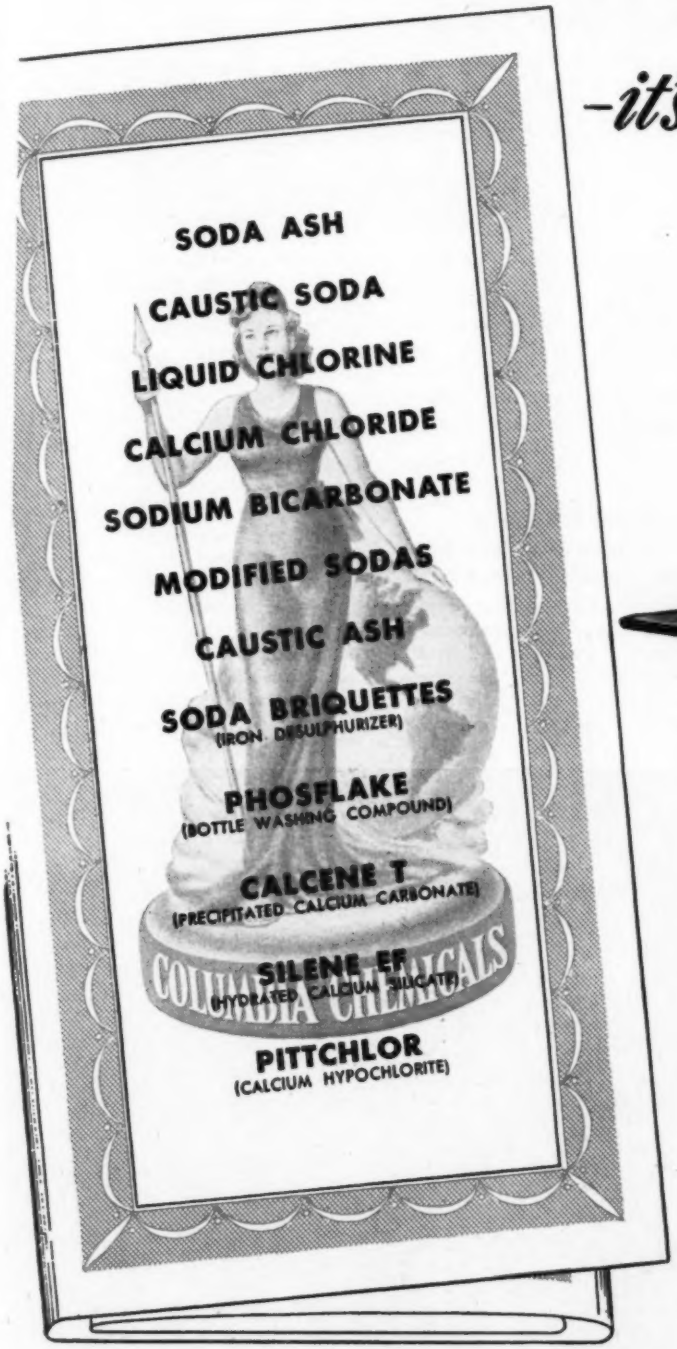
A major portion of the government-owned plant at Lake Charles, Louisiana, has been leased by the Southern Alkali Corporation, according to a recent announcement. (Southern Alkali Corporation is owned jointly by the Pittsburgh Plate Glass Company and American Cyanamid Company.)

The Lake Charles plant, which was built during the war for the Defense Plant Corporation, was designed for the production of magnesium metal.

An extensive remodeling program, estimated at one year, will begin immediately. Renovation of the plant will be made by the H. K. Ferguson Company, industrial engineers and builders, of Cleveland and New York.

Specify COLUMBIA

—it's Good Insurance



Columbia products meet exacting requirements . . . plants are favorably located . . . distribution facilities are organized for superior service. Equally important—Columbia policies contribute to enduring business relationships.

That's why it's good insurance for your business to specify "Columbia" when ordering alkalies and related chemical products.

COLUMBIA CHEMICALS

PITTSBURGH PLATE GLASS COMPANY • COLUMBIA CHEMICAL DIVISION

FIFTH AVENUE AT BELLEFIELD, PITTSBURGH 13, PA. • Chicago • Boston • St. Louis • Pittsburgh
New York • Cincinnati • Cleveland • Philadelphia • Minneapolis • Charlotte • San Francisco

ASSOCIATIONS

CHICAGO PRO CLUB SEES NEW KODACHROME SOUND FILM

At the March meeting of the Chicago Professional Paper Group held at the Chicago Bar Association, members and guests were privileged to hear a brief talk by D. C. Donaldson of the Eastman Kodak Company, and view a new Kodachrome Sound Film which has been produced by Eastman, covering in detail the subject "Modern Photo-Engraving."

Mr. Donaldson first outlined the evolution of picture reproduction, from the day of the "Wood-cut" down through the "Stone-Lithographing" methods, line drawing reproduction and introduction of the screen to break up solids into the resulting tones, he also touched briefly on the development of four-color Process.

His remarks were comprehensive, and served as an excellent preliminary to the very informative film.

After viewing the intricacies and the exacting methods necessary to produce "Four Color Engravings" from Kodachrome and art work, all present received a greater appreciation of the art, and the necessary high cost of producing this type of advertising.

◆

JOINT HONORS SHOWN PULPWOOD COUNCIL AND FRANK BLOCK ASSOCIATES

Honors were shared by the U. S. Pulpwood Council and the public relations firm of Frank Block and Associates at the annual Awards Banquet of the American Public Relations Association, held March 30 in the Hotel Statler, Washington, D. C.

The Association's award—a silver anvil, representing the anvil of public opinion—was presented to the Council and to the Block organization for its "meritorious work in the field of agriculture," in recognition of the Pulpwood Industry's 1945 Victory Pulpwood Campaign.

Presentation of the trophy was made by Secretary of Agriculture Clinton P. Anderson. The pulp and paper industry was represented at the affair by Charles J. Dynes, of Hollingsworth and Whitney. Mr. Dynes is at present in Washington as special assistant to the administrator, Civilian Production Administration.

The U. S. Pulpwood Council is headed by James L. Madden, president of Hollingsworth and Whitney, as chairman. The Frank Block firm, which conducts the Council's public relations effort, specializes in pulp and paper industry public relations.

◆

ALL-DAY FORUM WILL BE A FEATURE OF ANNUAL MEETING OF SUPERINTENDENTS ASS'N

At the annual meeting of the American Pulp and Paper Mill Superintendents Association, to be held at Poland Spring, Maine, June 17-20, the entire day of Wednesday, the 19th, will be given over to a forum on Improvements and Developments in the Paper Industry. In brief, this forum will be a preview of things to come. The program will be divided into five parts: (1) wood operations, (2) pulping, (3) stock preparation, (4) paper machines, and (5) engineering.

Suppliers will be given an opportunity to tell members of the Association about the new and improved equipment and supplies they have been preparing for the industry. Short talks, not over five minutes each, will be given describing these new ideas. Short discussions will follow each talk.

Firms interested in presenting their ideas at this forum should notify the convention secretary, G. W. Craigie, 220 East 42nd Street, New York 17, New York. Such arrangements should be made as quickly as possible.

◆

▶▶▶ A SURVEY by the Electric Industrial Truck Association, Chicago, reveals that manufacturers of paper and allied products rank ninth among the nation's private industrial and commercial users of electric trucks. The survey shows that 1,242 electric industrial trucks were being used to solve material handling problems at 331 plants in the paper industry at the close of 1945. Throughout the nation, a total of 24,802 electric trucks were in service at 5,000 plants, exclusive of government facilities.

At the annual banquet of the American Public Relations Association, honors were shared jointly in the field of agriculture for the industry's Victory Pulpwood Campaign. Joint awards were conferred upon U. S. Pulpwood Council and the public relations firm of Frank Block and Associates. Left to right—Frank Block, and two other trophy winners in the field of agriculture; Charles Speaks, president of the Milk Industries Foundation, and Keith Himebaugh, representing the U. S. Dept. of Agriculture

Light-Fast COLORS ... for PAPER

Mapico Colors are permanent ... highly resistant to light, acids and alkalies. This characteristic together with their fine particle size, good fiber adhesion and chemical and physical stability has made Mapico Colors widely popular as colorants for a great variety of papers, cover stocks and board.

Look to **MAPICO** *for Leadership*

- DEPENDABILITY
- HIGH TINTING STRENGTH
- ECONOMY

If you wish technical cooperation our laboratory staff always is available.

MAPICO *Colors*

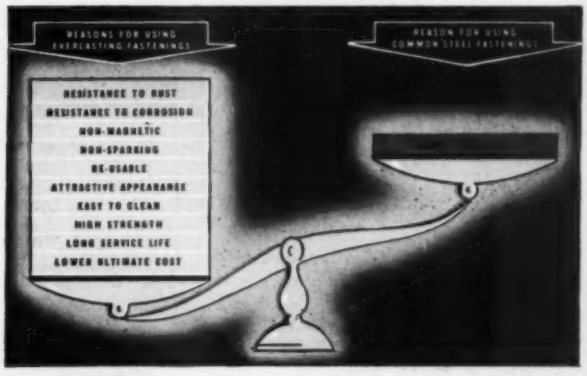
PURE OXIDES OF IRON

COLUMBIAN CARBON COMPANY
MAGNETIC PIGMENT DIVISION
MANUFACTURER
BINNEY & SMITH CO., *Distributor*
41 East 42nd St. • New York 17, N.Y.

YELLOWS • REDS • BROWNS • BLACK

10 to 1

IN FAVOR OF EVERLASTING FASTENINGS



Here's the score. 10 or more reasons for using everlasting fastenings . . . just 1 for common steel. An amazing combination of advantages in favor of nonferrous and stainless bolt and nut products . . . only lower first cost in favor of common steel. Check the list against your own fastening requirements. Write us for details.

PROMPT SHIPMENTS FROM STOCK

Harper maintains stocks of over 4360 different items . . . large quantities of each. Others being added constantly. Specials made to order from ample stocks of new metals. Write for 104 page 4-color catalog.

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BRASS • BRONZES • COPPER • MONEL • STAINLESS

MID-AMERICA EXPOSITION TO BE HELD IN CLEVELAND

A gigantic industrial exposition is scheduled for Cleveland, Ohio, from May 23 through June 2. Public Hall and all exhibition halls will be turned into a massive show window where a display of postwar commercial and home products will be spotlighted during the eleven-day showing.

This Mid-America Exposition, which it is expected will draw upwards of a quarter-million people this year, will have no geographical fences. Generally, however, the exhibitors are being invited from a region staked out by Detroit, Cincinnati, Pittsburgh, and Buffalo, with Cleveland as the capital. The show is not confined to any particular industry or group of industries, but will represent every type of industry in the region with a new, old, or interesting product or manufacturing process.

Information on space and tickets may be secured from Exposition Headquarters, 226 Public Hall, Cleveland 14, Ohio.

◆

ECONOMIST SPEAKS BEFORE FLEXIBLE PACKAGING INST.

Speaking before a meeting of the Flexible Packaging Institute at the Hotel Claridge in Atlantic City, J. Baker, economist, said: "The production index is increasing and in December of this year will be about twice what it was in December, 1939." Mr. Baker also declared that "Available labor is decreasing and will continue to decrease—and now is the time to hire for sales and office forces particularly."

Other speakers heard by members of the Institute and their guests were:

Gordon H. Friend

J. A. C. Kavanagh

F. E. Greenwald, of National Adhesives, who spoke on adhesives affected by the corn supply; and Mr. Aiken, of Goodyear Tire & Rubber Company, who discussed coatings, particularly Pliolite. E. R. Lake, of the du Pont Company, reviewed the supply and demand situation on cellophane from 1941 to the present time.

Gordon H. Friend is president of the Institute; J. A. C. Kavanagh is director.

◆

NAT'L COUNCIL TO TAKE OVER WORK OF WIS. KRAFT WASTE DISPOSAL COMMITTEE

At a meeting held at the Institute of Paper Chemistry in Appleton (Wis.) March 15, plans were completed whereby the National Council for Stream Improvement will take over all of the activities of the Wisconsin Kraft Waste Disposal Committee.

Since 1941, the Kraft Waste Disposal Committee has sponsored extensive research regarding the pollutional effects of kraft mill effluents. The nature of the research conducted was in connection with determining the relative toxicity of black liquor constituents on fish life.

In 1945, at the suggestion of the Kraft Waste Disposal Committee, the National Council sponsored and financed an intensified research project at the Institute of Paper Chemistry relating to the effect of kraft mill wastes on aquatic life, including certain technical aspects of the problem such as determining the effect of effluents on micro-fauna upon which fish feed and the analysis of toxicity testing methods.

An extended and intensified program at the Institute will be carried on during 1946 under the National Council's financing. This program will concern itself not only with continuing the work previously inaugurated, but, in addition, with developing the research findings to mill application. This latter phase will include developing toxicity tests which can serve for mill control tests under actual operating conditions.

◆

PRESS SUPT. ADDRESSES EMPIRE STATE SEC. TAPPI ON PRINTING PROBLEMS

The April meeting of the Western New York Group of the Empire State Section of the Technical Association of the Pulp and Paper Industry was held at the Prospect House, Niagara Falls, New York, on April 10.

Following the dinner, E. A. Aitken, superintendent of the Press Room, Bryant Press, Ltd., Toronto, spoke on printing problems. Being a practical printing man he was able to present this subject from practical experience. He spoke principally on the subject of four-color letter press printing and emphasized the fact that paper makers and printers should work in closer collaboration to make paper adaptable for the printer's use.

He showed many examples of different kinds of paper used in printing and also the different types of color work used on these papers. The uniformity of the particular type of paper, he pointed out, is a determining factor in the quality of the finished product. Variations from sheet to sheet of one type of paper may produce an almost unacceptable printed product.

Moisture-proof wrapping of paper by the manufacturer is a great help to the printer as it reduces to a minimum the amount of wavy edge and buckle paper. This type of paper causes much extra work on the presses in order to produce a satisfactory job. He explained the methods used to make it possible to use these types of papers on the presses. Similar trouble is encountered when the paper is of the wrong grain direction.

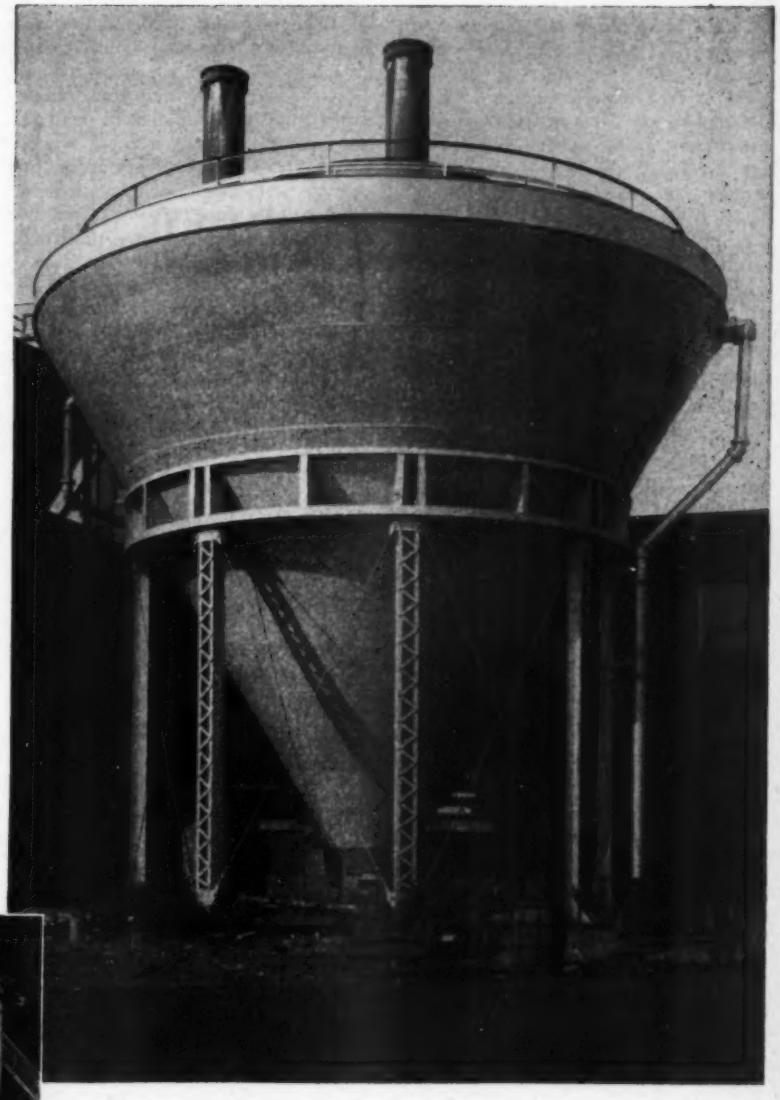
Another difficulty encountered in printing is the selection of the right type of paper for the particular job in mind. An important factor to be considered is the opacity of the paper. This determines to a great extent the amount of show-through on the paper.

He explained how some grades of paper cause much lost time on the press. One example of this was a bulking novel paper which has such a loose surface that fibers from it fill up the plates, necessitating frequent wash-ups. Another paper of practically the same grade but with a much harder surface can be run on

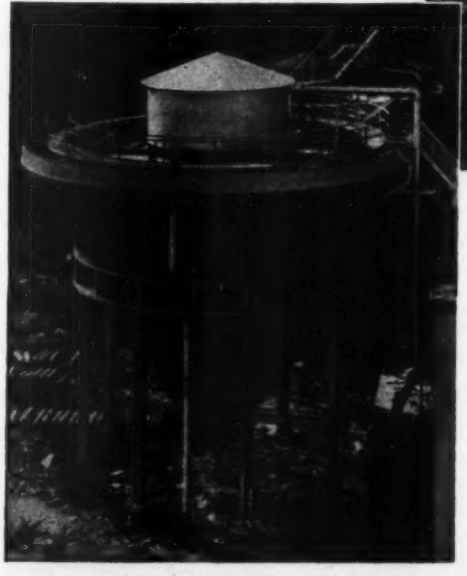
NEW WELDED

MARX CONICAL SAVEALL

. . . recovers 90 per cent of fibrous solids from waste white water at a paper board mill



The Marx Saveall illustrated in these views is 44 ft. in diam. at the top, 35 ft. 6 in. high and holds 130,000 gals. of water.



● This Marx Saveall, the second installed at a folding box board mill, consists primarily of two large steel plate cones one mounted inside the other. The inner cone has a large opening at the bottom. There is also a small cone-shaped receiving well at the top and an inverted de-aeration cone directly under the receiving well. Waste white water from the paper board machines is fed into the receiving well as the top. The suspended solids settle through the bottom of the inside cone, collect in the bottom of the outside cone and are drawn off and re-used in the paper making process. The water minus most of the solids rises between the two cones and overflows into a weir at the top of the outer cone. From there it is piped to the mill for re-use or discharged into a drain.

Write our nearest office for quotations on Marx Savealls and other field-erected steel plate structures.

CHICAGO BRIDGE & IRON COMPANY

Chicago, 4.....2445 McCormick Building
New York, 6.....3350-165 Broadway Building
Cleveland, 15.....2267 Guildhall Building
Los Angeles, 14.....1459 Wm. Fox Building
Birmingham, 1.....1511 North 50th Street
Atlanta, 3.....2143 Healey Building
Tulsa, 3.....1651 Hunt Building
Houston, 1.....5643 Clinton Drive
Philadelphia, 3.....1653-1700 Walnut Street Building
Washington, 4.....703 Atlantic Building
San Francisco, 11.....1217-22 Battery Street Building
Detroit, 26.....1866 Lafayette Building

Plants at BIRMINGHAM, CHICAGO and GREENVILLE, PENNA.
In Canada: HORTON STEEL WORKS, Limited, FORT ERIE, ONT.

the press for a much longer period of time without the necessity of washing-up.

Mr. Aitken showed samples of synthetic printing plates which were very satisfactory from his experience. It was his belief that these plates will be used much more in the future.

Mr. Aitken concluded his talk with a discussion of the purpose of printing clinics. Mutual benefit to both the printer and the paper maker usually results from these clinics.

◆

RESEARCH ASSOCIATE APPOINTED BY CANADIAN PULP AND PAPER ASS'N

In recent years some substantial research on promotion of efficiency in conventional techniques of pulpwood logging has been done by the Pulp and Paper Research Institute of Canada in co-operation with the Woodlands Section of the Canadian Pulp & Paper Association.

The woodlands research staff of the Institute consisted of A. Koroleff, director of Woodlands Research and manager of the Woodlands Section, and one research associate; but the latter position, since the resignation of J. F. Walker in the fall of 1944, remained vacant through 1945.

H. D. Long has been appointed to fill this vacancy, and C. R. Silversides has been appointed as another research associate, also to give full time to studies on forest management. Both men have had some previous experience in this work, and generally are very well qualified. Mr. Long is a graduate in forestry of the University of New Brunswick, and Mr. Silversides of the University of Toronto.

◆

NATIONAL FIRE PROTECTION ASS'N MARKS GOLDEN ANNIV.

The golden anniversary of the National Fire Protection Association will be honored internationally June 3-7.

Fifty years ago a small group of public spirited New Englanders met after work in a small Boston (Mass.) office and declared war on fire. From that humble beginning grew the present world-wide, independent, technical and educational organization with members in 37 countries.

Throughout its 50 years of growth, a prime function of the NFPA has been to provide standards for the entire field of fire waste control. The Association sponsors three important sections: a Fire Marshal Section organized in 1927; a Marine Section organized in 1934, and a Railroad Section organized in 1944. A major activity of the Association is the production of complete popular and technical literature in the field of fire waste control. From five to ten million copies of its publications are issued each year, ranging from 1,000-page volumes to small factory payroll leaflets warning workers about fire. The Association has three regular periodicals and more than 300 publications currently in print. It is non-commercial and non-profitmaking, and is supported by the dues of its members which number over 150 national organizations and more than 10,000 individuals. While 40 per cent of members are industrial organizations and business leaders, its membership is open to any individual or organization interested in the protection of life or property against fire.

◆

NAT'L WOOD TANK INSTITUTE FORMULATES STANDARDS FOR PULP AND PAPER INDUSTRY

At the annual meeting of the National Wood Tank Institute, held in Chicago April 3-6, the following officers were elected:

President—Carl Carlson, Johnson & Carlson Tank Company, Chicago

Vice president—S. Levine, Industrial Mfrs. Ltd., Los Angeles.

Secretary—F. W. Wendnagel, Wendnagel & Company, Chicago

Treasurer—M. J. Marcuson, U. S. Challenge Company

Exec. Director—S. E. Chaney, Glendale, California

The Institute has a committee formulating wood tank standards covering all phases of industry including standards covering the pulp and paper industry. These standards should be in print and available during this year. Those desiring technical information may communicate with the executive offices of the Institute at 53 West Jackson Boulevard, Chicago 4, Illinois.

◆

TRAIL BLAZERS EXHIBIT WILL BE FEATURE OF THE CHICAGO CHEMICAL EXPOS.

"Chemical Trail Blazers," a popular educational feature of the National Expositions, sponsored by the Chicago Section of the American Chemical Society, will be expanded and given still greater prominence at the next exposition, scheduled to be held September 10 to 14 inclusive, in the Coliseum at Chicago.

Dr. H. E. Robinson, exposition chairman, announces that those who make the most outstanding contributions to this symposium of displays of new ideas, new discoveries, new developments, and new applications in industrial chemical progress will be honored by presentation of certificates.

The "Chemical Trail Blazers" exhibit unit will slip into a frame 3 ft. wide and 4 ft. high, with the third dimension being available up to a maximum of one foot. Successful exhibitors in the competition of sketches will be given space and accompanying exposition services at no expense to them. However, the cost of the exhibit and transportation both ways must be borne by the exhibitor.

Entries, together with preliminary sketches, will be received by James K. Stewart, chairman, Chemical Trail Blazers, 1513 South Wabash Avenue, Chicago 5, until May 15. Final sketches must be in his hands on or before July 4. No formal entry blanks will be issued by the Chemical Trail Blazers Committee. Detailed information is available from Dr. Stewart, chairman of the committee.

The Chicago Section of the American Chemical Society, sponsor of the show, announces the reappointment of Marcus W. Hinson as manager, and the opening of headquarters to the Coliseum administration building at 1513 South Wabash Avenue, Chicago 5, Illinois.

◆

COMING EVENTS

May 11—Annual Ladies Night of the Michigan Division of the American Pulp and Paper Mill Superintendents Association, to be held at the Park-American Hotel, Kalamazoo, Michigan.

May 16-19—Joint meeting of the Pacific Coast Division of the American Pulp and Paper Mill Superintendents Association and the Pacific Coast Section of TAPPI, at the Gearhart Hotel, Gearhart, Oregon.

May 10-11—Pennsylvania, New Jersey, Delaware Division of American Pulp and Paper Mill Superintendents Association, at Hotel Ritz-Carlton, Atlantic City, N. J.

May 23-June 2—Mid-America Exposition (Tickets and space info. may be secured by addressing Exposition Headquarters, 226 Public Hall, Cleveland 14, Ohio.)

June 17-20—Annual convention American Pulp and Paper Mill Superintendents Association, Poland Spring House, Poland Spring, Maine.

July 8—Southern Paper and Pulp Association, Asheville, North Carolina.

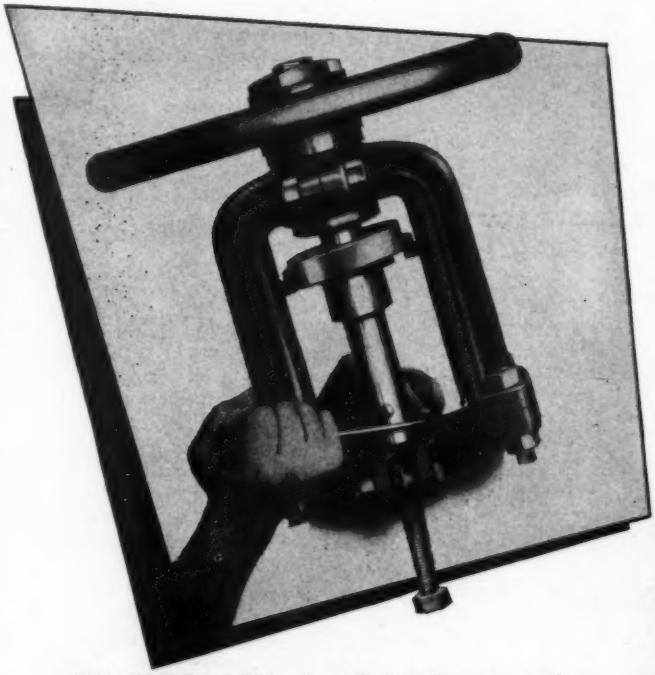
Sept. 10-14—National Chemical Exposition, The Coliseum, Chicago.

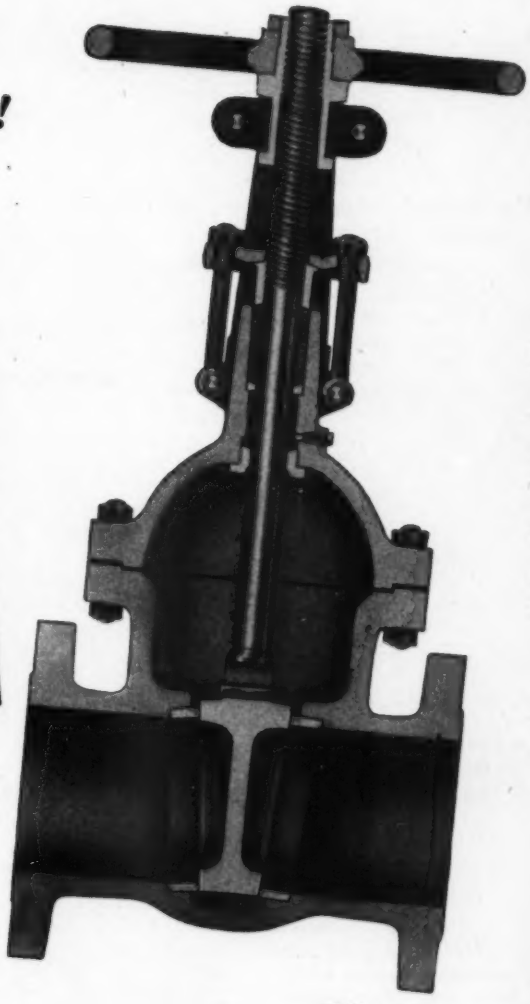
Sept. 13-14—Fall meeting of the Northeastern Division of the American Pulp and Paper Mill Superintendents Associtaion, at Mount Washington Hotel, Bretton Woods, New Hampshire.

Sept. 16-20—First National Instrumentation Conference and Exhibit, Wm Penn Hotel, Pittsburgh, Pa.

Oct. 7—National Safety Congress, in Chicago. Headquarters and exhibits at Stevens Hotel. Meetings may be held in Stevens, Palmer House, and Congress Hotels.

You don't need 3 hands *to repack this valve!*





This OIC Steel Valve has all the advantages of 2-piece gland-and-follower construction PLUS the exclusive LIFT-LOK feature. When repacking is needed the maintenance man lifts gland and follower as a single unit. He turns the gland slightly so that its cam-shaped rim rests on two lugs on the yoke. Then he repacks easily and quickly without fumbling or hindrance.

This is *only one* of many ways we have found to give you more for your money with OIC Valves. Your OIC distributor has the full story.

The LIFT-LOK is one of the standard features of OIC Steel Valves. Your OIC Distributor can give you detailed information on special advantages in OIC Iron and Bronze valves for all applications.

THE OHIO INJECTOR COMPANY

OIC **VALVES**

WADSWORTH • OHIO

K-C BEGINS SIX-MONTH SAFETY CONTEST AT ITS KIMBERLY (WIS.) MILL

A six-month contest was begun at the Kimberly (Wis.) mill of Kimberly-Clark Corporation on April 1. The various departments have been grouped into six competing teams and during the contest period each team will sponsor a one-hour safety program each month at the clubhouse.

The rules of the contest provide that each lost-time accident will count one point against the team, of which the injured employee is a member. Every four doctor-care cases will count one point, the same as one lost-time accident. Cases referred to the doctor by nurses for minor injuries will not count against the team.

At the close of the contest, September 30, the winning team will be awarded $300; each of the other teams, in their order, will receive $50 less.

◆

NEW SOUND SLIDEFILM RELEASED BY N. S. C.

A new slidefilm entitled "For You and Yours," has been completed by the National Safety Council.

With the death and injury toll from accidents mounting, the film presents an urgent appeal for everyone to join in a united effort to stop the needless waste of human life and untold suffering caused by accidents. It covers all phases of safety—traffic, industrial, home, farm, and school.

Featuring Edward G. Robinson, motion picture and radio star, and the popular radio song trio, the Dinning Sisters, the film dramatically describes the fast growing, nationwide safety movement and the part the National Safety Council, the local safety council and other safety organizations play in it.

◆

▶▶▶ THE GRAND AWARD of the Philadelphia Safety Council for the greatest percentage reduction in accident frequency in Philadelphia per million man-hours worked in 1945 has been presented to the Radio Division of Philco Corporation. The Company ranked highest among 137 plants employing 123,106 persons in the five counties in the Philadelphia area included in the 1945 Inter-Plant Accident Reduction Contest.

◆

▶▶▶ THE VALUE OF a standard safety color code has been borne out by the experiences of the 26 Quartermaster Corps and Army Air Forces Depots in which such a code has been generally adopted. Certain types of accidents resulting in disabling injuries, have been entirely eliminated, while others have been reduced from a frequency of 46.14 to a yearly average of 5.58 since the employment of the safety color code.

◆

SAFETY SCORES

▶▶▶ PERFECT SCORES are recorded for eleven mills at the close of The Paper Industry Safety Contest for the eighth month, February, 1946.

Division I—Pulp and Paper Mills

Group A—None.

Group B

Kimberly-Clark Corp., Niagara, Wis.
The Flintkote Co., Meridian, Miss.

Group C

Price Bros. & Co., Ltd., Jonquiere Mill, Quebec, Can.

Group D

Strathmore Paper Co. (Woronoco Mill No. 2), West Springfield, Mass.
Marathon Corp., Ashland, Wis.
E. I. duPont de Nemours & Co., Ind. (Russell Plant).
Strathmore Paper Co. (Woronoco Mill No. 1), West Springfield, Mass.

Division II—Paper & Board Remanufacturing

Group A—None.

Group B

Fort Wayne Corrugated Paper Co., Chicago.
Bird & Son, Inc. (Roofing Plant), Shreveport, La.
The Flintkote Co. (Hollywood Paper Box Div.), Los Angeles, Cal.
Bay West Paper Co., Green Bay, Wis.

NEW PROCESSES require correctly engineered linings

Stebbins installs the correct linings because for 62 years they have devoted themselves to the development of linings for the pulp and paper industry. One contract, one responsibility covers the complete installation, involving: (1) an analysis of your problem, (2) a serviceable and durable design, (3) a construction for economy and efficiency.

Consult Stebbins when lining problems arise.

Stebbins Engineering and Manufacturing Company
EASTERN BOULEVARD, WATERTOWN, NEW YORK

Dryer Felts

"Engineered" to Each Mill's Requirements

With experience in the manufacture of dryer clothing, dating back to the beginning of the modern paper dryer, HOOPERWOOD "Canvas Engineering" has produced not one but several distinct types of Cotton and Asbestos Felts.

This policy has been of real assistance to Paper Mill Superintendents, in suiting the particular requirements of their mill—even down to each machine position, if desired.

Therefore, if it is a rugged, heavy felt you need for fine finish in normal production . . . or a lightweight, extra-porous felt for faster drying . . or an Asbestos Felt to withstand the advanced temperatures involved in high-speed production of Kraft and other heavy papers—HOOPERWOOD "Canvas Engineering" has the answer to your problem.

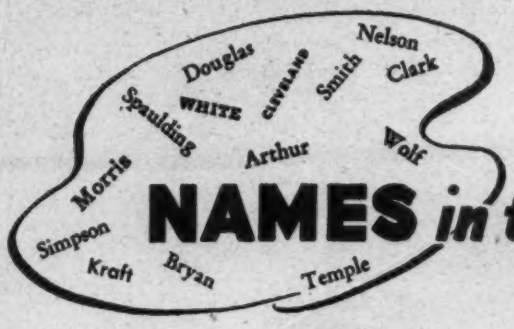
WM. E. HOOPER & SONS CO.

New York **PHILADELPHIA** Chicago

Mills: WOODBERRY, BALTIMORE, MD.

HOOPERWOOD DRYER FELTS

COTTON AND ASBESTOS



NAMES *in the News*

FRANK JUCKETT HONORED ON TENTH ANNIVERSARY WITH SANDY HILL WORKS

On April 1, the tenth anniversary of his connection with the company, Frank A. Juckett, president of The Sandy Hill Iron and Brass Works, Hudson Falls, New York, was honored by company associates.

A huge basket of flowers greeted Mr. Juckett when he arrived at the office in the morning, and all through the day a line of visitors from the shop, the foundry, and the offices came to shake hands and to offer congratulations.

Under Mr. Juckett's management, the company has expanded from 85 employees in 1936 to 700, with three shifts during a winch-building program during the war. The plant has now reconverted to the manufacture of pulp and paper mill machinery.

When Mr. Juckett joined Sandy Hill he brought with him a rich background of pulp and paper mill experience gained with Strathmore Paper Company at West Springfield, Massachusetts, and the Old Colony Envelope Company, of the same city. He had been with Strathmore for ten years.

◆

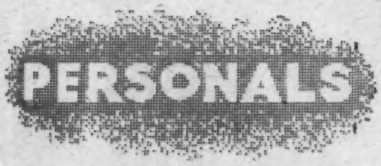
▶▶▶ With headquarters in Atlanta, Georgia, *John Jennings* has been appointed southeastern district manager of paper container sales by Continental Can Company. Mr. Jennings has been connected with the paper and paper products business for some twenty years.

◆

DR. O. E. MAY LEAVES THE GOVERNMENT SERVICE

In honor of Dr. Orville E. May, chief of the Bureau of Agricultural and Industrial Chemistry, U. S. Department of Agriculture, who has left the government service, John W. Boyer, chemical engineer and former WPB Chemical Division executive, was host at a dinner in the Mayflower Hotel, Washington, on March 28.

Dr. May has spent 23 years in public service; he is now associated with the Coca-Cola Company in chemical research. He began his government service as a laboratory assistant. Dr. L. B. Howard, formerly director of the Western Regional Laboratory of the Bureau at Albany, California, will succeed him.



◆

F. M. BECKER NOW PRES. OF BIRD MACHINE CO.—TO SUCCEED PHILLIPS DENNETT

F. M. Becker, for many years vice president of Bird Machine Company, South Walpole, Massachusetts, has been elected president of the company, succeeding Phillips Dennett who retired April 1 after thirty-five years with the company, the past twenty years as its president.

Mr. Dennett has been president of the Pulp & Paper Machinery Association since its formation in 1933. At the beginning of the war, when the Pulp & Paper Machinery Industry Metals Committee was set up to work with the War Production Board, Mr. Dennett was elected chairman of the committee and remained in that post until the WPB set up its own committee for the purpose in Washington. At that time he was appointed the War Production Board's consultant on special machinery. He has also served on the advisory committee for the Pulp & Paper Machinery Industry operating in connection with the War Production Board. Mr. Dennett has likewise been a member of the Executive Committee of the Machinery & Allied Products Institute.

Mr. Becker is widely known throughout the paper industry. He has been associated with Bird Machine Company since 1916 except for leave of absence during World War I in which he served as a flying officer with the Army Air Forces in France. He was made Vice President in Charge of Sales in the company at the time Mr. Dennett became President. During the war he was placed in charge of manufacturing in connection with the company's heavy war production program and has functioned in this capacity as well as in charge of customer relations for the entire war period and up to the present. He has presented many papers at meetings of TAPPI and the Superintendents Association.

◆

▶▶▶ The addition of *William F. Halsey III* to the staff of its New Products and Market Analysis Division has been announced by Brown Company. Released from service in February with the rank of Lieutenant, Mr. Halsey was promoted to Lt. Commander on April 1. He will be located at the company's New York Sales office, 500 Fifth Avenue.

Attending the honorary dinner for Dr. Orville E. May were: At head of the table, John W. Boyer, host; (around the table counter-clockwise) Dr. May, Lawrence Brown, chief, Chemicals Division, Civilian Production Administration; Dr. J. A. Hall, director, Pacific Northwest Forest and Range Experiment Station, U. S. Dept. of Agriculture; Dr. H. T. Herrick, asst. chief, Bureau of Agricultural and Industrial Chemistry; Dr. Robert E. Sebastian, chief of the Aluminum and Magnesium Division, Civilian Production Administration; and Dr. L. B. Howard, formerly director of the Western Regional Laboratory of the Bureau at Albany, Calif., who succeeds Dr. May

But there's nothing rare about the applications for Taylor Spiral!

THERE isn't much need for anxiety about engineers leaning too far to the light side in designing piping. Naturally, where conditions require, wall thickness is cautiously calculated and topped off with a generous factor of safety.

However, there *is* some justification for concern over the practice of using heavier pipe than needed. Too often the pipe designer breathes a sigh of relief when he comes to those low or moderate pressure jobs, quits figuring, and simply falls back on his old standby, Standard Thickness pipe!

Of course this is done on the theory that Standard Thickness represents the low point on the scale of available pipe thicknesses and is therefore a safe "out". It's safe enough, but it just happens that there is another kind of pipe, amply safe but much lighter than Standard Thickness, which can satisfy a large percentage of those everyday pipe requirements.

Yes, if you will look at the record you will find that light-but-strong Taylor Spiral Pipe can handle a big percentage of the run-of-plant services—applications like those listed below—and handle them with strength and service life to spare. Naturally this means dollars saved—dollars saved in first cost, in transportation cost, in handling cost, in erection cost, in the cost of supporting structures. In fact, the installed cost of Taylor Spiral Pipe in many cases is scarcely half that of the heavy pipe it so well replaces.

Switching to Taylor Spiral Pipe for services like those listed is made easy by the complete range of sizes and wide variety of fittings. Thicknesses range from 12 to 6 gauge; sizes from 6" to 42"; joint lengths up to 40 ft. All types of end joints and couplings, all kinds of fittings and specials or fabricated assemblies are produced by Talor Forge & Pipe Works, assuring complete service and undivided responsibility.

TAYLOR FORGE & PIPE WORKS

General Offices & Works: Chicago, P. O. Box 485 ★ New York Office: 50 Church St. ★ Philadelphia Office: Broad Street Station Bldg.

CHANGE TO TAYLOR SPIRAL PIPE FOR:

- High and Low Pressure Water Lines
- Low Pressure Steam and Air Lines
- Steam and Diesel Exhaust Lines
- Vacuum and Suction Lines
- Blower Piping
- White Water Lines
- Pulp Stock Lines
- Paper Stock Lines
- Alkaline Lines
- Size Lines
- Swing Pipe
- Spray Pond Piping

McKEOWN NOW WITH NAT'L ALUMINATE—TO WORK ON PAPER MILL SLIME CONTROL

With new and larger bacteriological facilities under construction, the National Aluminate Corporation, industrial water treatment consultants and engineers, Chicago, has acquired the services of L. A. McKeown, B.Sc., of Montreal, Quebec, to direct research on the study of slime control in paper mills.

Mr. McKeown has specialized in the study of control of slime in paper-mill operations for the past six years. After receiving his degree in science from Montreal University, he joined Aluminate Chemicals Limited of Toronto, an associate company of National Aluminate Corporation.

◆

▶▶▶ Kimberly - Clark Corporation, Neenah, Wisconsin, recently appointed *Edward Davitt* as comptroller. Mr. Davitt was formerly with the Chicago offices of Haskins & Sells.

◆

▶▶▶ Purchasing agent for the company's glass division is the appointment given *Alfred D. Nutter, Jr.*, by the Pittsburgh Plate Glass Company. Mr. Nutter has been assistant to the glass division purchasing agent; he has been associated with the company for twelve years, and succeeds Homer M. Hoffman who retired recently.

Correction, please . . .

George E. Williamson

The above illustration appeared on page 1864 of the March issue of this magazine, and a mistake in the legend is regretfully acknowledged. The picture should have been titled as shown above, not John D. Zink as it appeared.—EDITOR'S NOTE

▶▶▶ Three promotions made in the Simonds Worden White Company, Dayton, Ohio, are: *Nels G. Johnson*, with the company since 1931, promoted from assistant sales manager to general sales manager; *John H. Allison*, also with the firm since 1931, and a salesman for the company, now sales manager of the grinding wheel division; and *Howard D. Blackburn*, the company's advertising manager, will continue in that capacity but is given the added duties as sales manager of the Machine-Knife division. Mr. Blackburn started with the company's sales department in 1942.

◆

▶▶▶ Recent personnel changes and new appointments of The Duriron Company, Inc., Dayton, Ohio, are: *R. C. Schenck*, son of the founder, has been made executive vice president; *D. E. Jack*, vice president in charge of sales and engineering, moved from Dayton to New York; *W. D. Staley*, formerly in charge of the Chicago sales office, now in charge of the New York sales office; and *R. A. Prosser*, formerly with Illinois Clay Products Company, has been put in charge of the Chicago sales office.

◆

▶▶▶ *Clarence W. Richen*, Portland, Oregon, has become chief forester of the Columbia River tree farms of Crown Zellerbach Corporation, succeeding *Axel J. F. Brandstrom* who resigned to become a forestry consultant. Mr. Richen, a graduate of Oregon State College, recently spent two years on special forestry projects for the Weyerhaeuser Timber Company and Crown Zellerbach.

◆

▶▶▶ At a dinner given by the Fox River Paper Corporation, Appleton, Wisconsin, with which he had been associated for fifty-two years, *Frank Sinner* was the guest of honor. Mr. Sinner recently retired from his position as ruling room foreman for the company.

◆

▶▶▶ Returning to his duties after more than three years of service in the Navy, *B. P. Spann*, well known in publication circles, has resumed his work as advertising manager of the Gardner-Denver Company, Quincy, Illinois.

◆

▶▶▶ The Board of Directors of the Continental Diamond Fibre Company, Newark, Delaware, recently elected *Timothy F. Murphy* a director to fill the vacancy caused by the death of *H. Clifford Campion, Jr.* Mr. Murphy is president of Beach & Arthur Paper Company, New York City.

Nels G. Johnson

John H. Allison

Howard D. Blackburn

STORE MORE ROLLS HANDLE THEM FASTER!

Rolls of various diameters and lengths, of hard kraft paper, corrugated board or soft napkin tissue, can be handled faster, easier and at lower cost, with a Cleveland Tramrail motor-driven roll grab and an overhead crane or rail system.

The cab operator, alone, can deliver rolls to and from storage, without leaving his cab. As he works and travels above the rolls, he is free of danger from falling rolls and is not hindered by floor obstructions. He can convey rolls directly to storage from paper machines, or if desirable, directly from storage to shipping, thus eliminating all time-consuming intermediate handling.

More rolls can be stored in a given area because no aisle space is needed and rolls can be piled on end 8 to 10 high. There is less spoilage because denting and crushing of corners is practically eliminated.

If you are among those alert executives who are making studies and preparing plans for the intensely competitive days ahead, we suggest that you consult our local representative, who will be glad to let you draw on his specialized experience without obligation.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING Co.
1165 EAST 283rd ST. WICKLIFFE, OHIO.

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

▶▶▶ Former field executive for Hammermill Paper Company, Erie, Pennsylvania, *Captain James P. (Jim) McClain* has joined the selling force of Reinhold-Gould, Inc., fine paper merchants of New York City, specializ-

Captain James P. McClain

ing in mill brand papers. Mr. McClain was associated with Hammermill from 1933 until he went into service in 1942. He returned to his work with Hammermill upon his return to this country in December, 1945.

◆

▶▶▶ Sales representative for the Stamford Division of The Yale & Towne Manufacturing Company in the Alabama-Louisiana-Mississippi territory, is the appointment recently given to *Richard W. Meacham*. After serving in the Navy, "Dick" Meacham brings to his new job ten years of experience in builders' hardware sales. He succeeds *"Van" Waldron*, who has been transferred to the New England territory.

◆

▶▶▶ A veteran in paper trade association work, *Dr. E. O. Merchant* has resigned as secretary-treasurer of the Groundwood Paper Manufacturers Association and the Salesmen's Association of the Paper Industry, and has retired from active business life. Dr. Merchant plans to make California his future home.

◆

▶▶▶ The Ever Ready Label Corporation, New York City, has named *Edward Blank*, formerly with the Government Printing Office in the Production Planning Section, as planning manager. Mr. Blank will co-ordinate the planning, scheduling, order writing and estimating sections into one operating division.

WINSLOW WILL REPRESENT FOUR FIRMS IN SOUTH AMER.

The appointment of W. G. Winslow as South American sales representative has been announced by four leading American manufacturers.

Mr. Winslow will handle the sales of the Falk Corporation's speed reducers and flexible couplings; the Monitor Controller Company's electric motor controls; The Reliance Electric & Engineering Company's motors and generators; and the Union Chain & Manufacturing Company's chains and sprockets.

From his headquarters in Sao Paulo, Brazil, Mr. Winslow will establish distributors in several industrial centers of the principal South American equipment markets.

◆

▶▶▶ On completion of four years as a pilot in the Navy Air Corps, *F. J. Hailer, Jr.*, joined the sales staff of Whittaker, Clark & Daniels, Inc., New York City, and will handle the company's general line of non-metallic minerals in the New England area. Mr. Hailer was formerly with the plastics division of Monsanto Chemical Company.

◆

▶▶▶ After nearly two years with the National Lumber Manufacturers Association, *James C. McClellan* has assumed a position as assistant forester with the American Forest Products Industries, Inc. He will continue his work in practical forest management for continuous forest production on privately-owned lands started while with NLMA. Also he will conduct the field promotional work of the Tree Farm Program now under the sponsorship of American Forest Products Industries.

James C. McClellan

▶▶▶ The new president of A. P. Green Fire Brick Company, Mexico, Missouri, is *Lt. Commander Robert S. Green*, now on terminal leave following Pacific fleet duty. His appointment as of May 1, makes him successor

Lt. Commander Robert S. Green

to his father, Allen P. Green, founder of the company, who steps to the office of chairman of the board. The company has also announced the creation of an executive committee of the board. Likewise a management committee in charge of operations will work with the new president.

◆

▶▶▶ The new president of the United States Paper Exporters Council is *Adelbert Greiner* (president of China American Paper & Pulp Company), who succeeds *Frank W. Smith* (National Paper & Type Company). *J. Francis Strub* (Parsons & Whittemore) was elected vice president, and *Kenneth W. Latham* (Moller & Rothe) is secretary-treasurer.

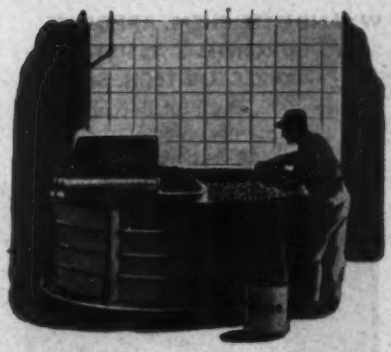
◆

▶▶▶ *John A. Elton* of Ridgefield, New Jersey, has joined the foreign sales division of the Brown Company, Berlin, New Hampshire, and will have charge of distribution of the company's products abroad.

◆

▶▶▶ Recently engaged in special sales development for the Weyerhaeuser Timber Company, Longview, Washington, *T. E. Moffitt* has been named sales manager of the Pennsylvania Salt Manufacturing Company of Washington, a subsidiary of the Pennsalt Company, Philadelphia. Mr. Moffitt was formerly sales manager for the Hooker Electrochemical Company, Tacoma. His headquarters will be at Tacoma.

NOW PAPER TOWELS CAN BE 26 TO 48% MORE ABSORBENT!



In Comparative Tests with Other Accepted Absorbency Materials, NOPCO 2272-R Gives Faster Absorbency and More Lasting Retention

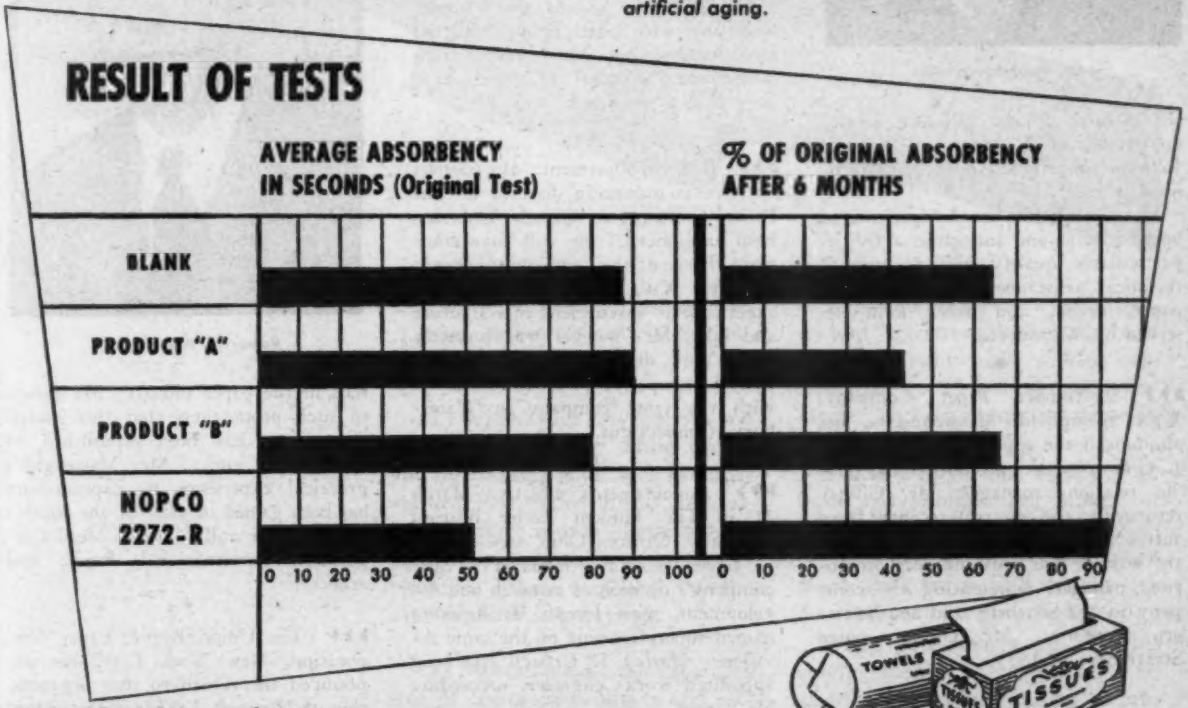
The absorbency tests, described below, show that in resisting the natural tendency of paper sheets to lose absorbency, NOPCO 2272-R has a clear-cut advantage over other absorbency materials. Even more important, regular mill users have already verified the results of these laboratory tests. To an increasing extent they count on NOPCO 2272-R to "stay with the fibers"—to assure more enduring absorbency in the *finished sheet*.

Testing Techniques Used... Sheets treated with three leading absorbency agents, including NOPCO 2272-R, and a separate group of sheets made from untreated stock were used in the tests.

Each product was added in the laboratory beater to stock composed of 300 grams of unbleached spruce sulfite and 200 grams of bleached aspen sulfite pulp dispersed with 12 liters of water. The stock was intentionally beaten to produce a harsh sheet, considerably below normal absorbency. Several hand sheets were made for testing purposes, following standard procedure.

Some sheets from each group were tested immediately for absorbency. Other sheets were tested at regular intervals for six months. Absorbency was measured by recording the time for 1 drop of distilled water to be absorbed completely into the sheet. Greater accuracy was assured, because these tests were the result of *natural* rather than *artificial* aging.

RESULT OF TESTS


AVERAGE ABSORBENCY IN SECONDS (Original Test)
% OF ORIGINAL ABSORBENCY AFTER 6 MONTHS
BLANK
PRODUCT "A"
PRODUCT "B"
NOPCO 2272-R
0 10 20 30 40 50 60 70 80 90 100
0 10 20 30 40 50 60 70 80 90

High Absorbency for Tissues, Too . . . Nopco 2272-R—a sulphonated vegetable oil ester—imparts higher absorbency to tissue stock as well as to regular toweling. Also successfully used in the manufacture of specialty papers, because Nopco 2272-R is compatible with solutions or dispersions of synthetic resins added to impart wet strength. Economical—only small amounts needed. Write for further details.

NATIONAL OIL PRODUCTS CO., Harrison, N. J.,
Branches: Boston; Chicago; Cedartown, Ga.; Richmond, Calif.

NOPCO

REG. U. S. PAT. OFF.

"An Affiliate of the American Pulp and Paper Mill Superintendents Associates".

EVOLVED THROUGH RESEARCH

NOPCO 2272-R
For Higher Absorbency

WYANDOTTE CHEM. APPOINTS DR. BURCHFIELD ASSISTANT DIRECTOR TECH. SERVICE

Since 1942, Dr. Paul Burchfield has been assistant supervisor of the chemical engineering section of Wyandotte Chemicals research department. As of May 1, Dr. Burchfield becomes assist-

Dr. Paul Burchfield

ant director of the technical service department of Wyandotte. Charles S. Johnson continues as director of technical service.

Dr. Burchfield's broad experience in both organic and inorganic activities particularly qualify him to provide technical assistance to the chemical, paper, rayon, and other industries served by Wyandotte.

◆

▶▶▶ Strathmore Paper Company, West Springfield, Massachusetts, has announced the appointment of *Albert L. Gibney* as sales promotion and public relations manager. Mr. Gibney returned to the company recently from active duty with the navy. Prior to the war, he was assistant sales promotion manager, representing the company in the southern and southwestern territories. Mr. Gibney joined Strathmore in 1939.

◆

▶▶▶ *Phil Ferrell*, who has been manager of the Weyerhaeuser Timber Company's pressed fuel plant at Longview, Washington, has recently been appointed to an executive position in the shingle operations of Columbia River Pulp and Paper Company, Vancouver.

◆

▶▶▶ Former technical superintendent of the Soundview Pulp Company at Everett, Washington, *Nils William Coster*, has been named general superintendent of the company. He succeeds *G. J. Armbruster* who has retired. *John M. Carlson* succeeds *B. A. Salmonson*, also resigned, as assistant general superintendent. *R. I. Thime* is now technical director in charge of control, and *Adolf Orup* has been placed in charge of research.

◆

▶▶▶ Announcement has been made of the appointment of *Andrew S. Ormsby* as director of industrial relations of Worthington Pump and Machinery Corporation, Harrison, New Jersey. Mr. Ormsby was formerly with the Bendix Aviation Company in a similar capacity.

◆

ROBT. RUTLEDGE REJOINS CUPPLES CO., ST. LOUIS

The connection of Robert E. Rutledge, formerly president of the Sutherland Paper Company, Kalamazoo, Michigan, with the Cupples Company, of St. Louis, Missouri, has been announced.

Mr. Rutledge rejoins the Cupples Company, with which he was affiliated two decades ago. He resigned from Sutherland December 31, 1945, having acted as president since 1942.

◆

▶▶▶ The appointment of *Charles Webber* as managing director of The Bristol Company of Canada, Ltd., has been announced. He will have complete charge of the company's Toronto factory. With over twenty-five years experience in instrument manufacture and sales, Mr. Webber was formerly New York district manager of The Bristol Company; prior to that, was with the same company in Waterbury, Connecticut.

◆

▶▶▶ Appointments effective March 25 in The Timken Roller Bearing Company, Canton, Ohio, are—*Walter F. Green*, assistant manager of the company's division of research and development, with *Joseph M. Roshong* named superintendent of the same division. *Harley J. Urbach* has been appointed works engineer, succeeding Mr. Green.

◆

▶▶▶ In charge of renewal parts and repairs for The Reliance Electric & Engineering Company, Cleveland, during the war years, *William G. Hall* has been made manager of a combined renewal parts and service division. In his enlarged responsibilities, Mr. Hall succeeds Arthur W. Ray, who retires after completing forty years with Reliance, the past twenty-one of them as service manager.

▶▶▶ Recent promotions in the Continental Can Company, New York City, are those of *P. P. Wojtul*, formerly assistant to the vice president and comptroller, and now assistant to the executive vice president Hans A. Eggerss; and *H. A. Swertfeger*, former chief industrial accountant, who succeeds Mr. Wojtul as assistant to the vice president and comptroller.

◆

▶▶▶ With headquarters at present in the company's Chicago office, *Robert L. Massengale* has joined The Dicalite Company (New York City) in the capacity of engineer in the paper products division. G. A. Russell, Dicalite's Central Division manager, states that the use of Dicalite diatomaceous mate-

Robert L. Massengale

rials in the paper industry has grown to such proportions that this special department has been established to handle the work. Mr. Massengale's practical experience in papermaking has been gained in some of the South's largest paper mills, such as Mead Corporation, International Paper, and others.

◆

▶▶▶ The Union Bag & Paper Corporation, New York City, has announced the return to that organization of *Henry P. Lankenau* as assistant sales promotion manager. Mr. Lankenau was recently discharged from the Navy after two and one-half years service.

◆

▶▶▶ The appointment of *Fred Erler* as plant superintendent for Westminster Paper Company, Ltd., New Westminster (B. C.), has been announced. Mr. Erler has been in the paper business since the age of fifteen. He joined the staff of the Westminister company

3 Advantages YOUR FOURDRINIER SAVE-ALL TRAYS CAN HAVE

This installation of Monel trays has served more than 4 years... yet has required no maintenance. Many Monel save-all trays are still in use after 15 years.

You obtain three important benefits ...from *modern* Fourdrinier save-all trays.

(1) When trays stay smooth and free of corrosion by white waters and by cleaning acids such as dilute sulfuric and hydrochloric (muriatic), the fibre moves along without heavy accumulations or lump formations. Fibre recovery by the save-all filter is improved.

(2) Smooth trays...with surfaces free of corrosion products and pitting...make clean-up a speedy, easy job. No laborious acid cleaning or brushing is required.

(3) When trays have both rigidity and high strength, they can be of relatively lightweight welded construction. Yet they'll take plenty of abuse...and maintenance costs will be negligible.

Save-all trays that combine all three advantages are made of MONEL. Your own machine builder has designed and constructed many such trays. Call on him for the replacements you need.

When you have a problem involving metals or corrosion . . . or when you want information on fabrication and welding . . . our Technical Staff will be glad to assist you. Write them.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall Street, New York 5, N. Y.

MONEL® NICKEL INCO TRADE MARK ALLOYS

MONEL®• "K" MONEL®• "S" MONEL®• "R" MONEL®• "KR" MONEL®• INCONEL®• NICKEL• "L" NICKEL®• "Z" NICKEL®
®Reg. U. S. Pat. Off.

in the latter part of 1945. Prior to going to the Pacific Coast, was assistant superintendent of the Marinette Paper Company, Marinette, Wisconsin.

◆

▶▶▶ *J. Kenneth Craver,* of the Monsanto Chemical Company's research staff at St. Louis, Missouri, has been appointed co-ordinator of plasticizers and resins for the Organic Chemicals Division of the company. He will act as a group leader co-ordinating operations of research, production and sales.

NICHOLS SUCCEEDS MASON AT TAYLOR INSTRUMENT COS.

The appointment of N. B. Nichols as director of the research division of the Taylor Instrument Companies, Rochester, New York, followed the resignation of Dr. H. L. Mason, who leaves Taylor to accept a professorship at Iowa State College.

Before the war, Mr. Nichols spent two years with the Taylor Research Division. He further demonstrated ability and leadership during four years association with the Radiation

N. B. Nichols

Laboratory, Cambridge, Massachusetts, a subsidiary of M.I.T., where he was in charge of a group that pioneered in developing numerous mechanisms required in automatic gunfire control.

◆

▶▶▶ Assistant district manager of the Atlanta (Ga.) office of Bowser, Inc., is the new post filled by *H. Cubbie Roane,* who has been with the Gulf Oil Corporation for the past twelve years. Prior to his association with Gulf, Mr. Roane was steam service en-

N. Cubbie Roan

gineer for Westinghouse Electric Corporation. The territory to be covered by Mr. Roane includes North and South Carolina, Georgia, Florida, Alabama, Mississippi, and eastern Tennessee.

◆

▶▶▶ *Donald (Don Mac) Macaulay,* for fifteen years in the New York printing, publishing and advertising circles as district sales executive for the S. D. Warren Company, Boston,

The Ideal Bleaching Agent

WHETHER YOU'RE BLEACHING GRAY soda or sulphite pulp, SOLVAY Liquid Chlorine, shipped in steel tank cars or in cylinders, is the most effective bleaching agent you can run directly into milk of lime. It is also efficient in slime control and for water treatment.

SOLVAY'S LIQUID CHLORINE PLANTS are conveniently located for fast, low-cost delivery . . . Syracuse, N. Y., Hopewell, Va., Baton Rouge, La.

INCLUDED IN OUR SERVICE TO THE PULP and paper industry is a staff of experts trained by years of research in your field. They are available to tackle your toughest problems. Don't be surprised if they suggest SOLVAY products. They have been serving pulp and paper manufacturers well for years.

"SPECIFY QUALITY - SPECIFY SOLVAY"

SOLVAY SALES CORPORATION

Alkalies and Chemical Products Manufactured by The Solvay Process Company

40 Rector Street **New York 6, N. Y.**

BRANCH SALES OFFICES:

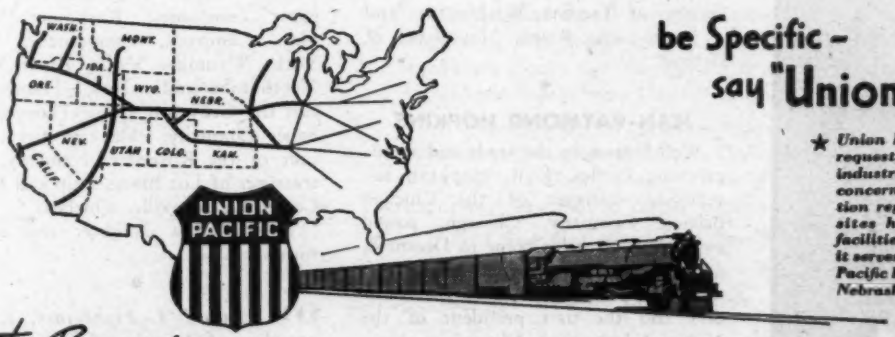
Boston • Charlotte • Chicago • Cincinnati • Cleveland • Detroit
New Orleans • New York • Philadelphia • Pittsburgh • St. Louis • Syracuse

Pictured above is another reason why Union Pacific can maintain fast schedules. It's one of the "Big Boys," 600-ton super-powered freight locomotives designed to meet industry's heaviest demands.

But it takes more than horsepower to keep shipments rolling on schedule. The "know how" of many thousands of trained Union Pacific employees . . . the time-saving Strategic Middle Route uniting the East with the West Coast . . . are *plus* advantages only Union Pacific provides.

Union Pacific traffic experts are located in metropolitan cities from coast to coast. Call on them to assist in solving your transportation problems.

For efficient, dependable freight service—



be Specific –
say "Union Pacific"

★ *Union Pacific will, upon request, gladly furnish industrial or mercantile concerns with information regarding available sites having trackage facilities in the territory it serves. Address Union Pacific Railroad, Omaha, Nebraska.*

The Progressive

UNION PACIFIC RAILROAD

The Strategic Middle Route

has resigned from that company to form his own paper merchandising organization, Donald Macaulay Paper Company, division of Lathrop Paper Company, with headquarters at 461 Eighth Avenue, New York.

◆

▶▶▶ Associated with the Pittsburgh Plate Glass Company's Columbia Chemical Division for 23 years, and chief engineer in chemical plants of the Division for the past five years, *Walter K. Farst* has been made general manager of the company's cement plant located at Zanesville, Ohio.

▶▶▶ Terminating a four-year leave of absence, *Dr. J. Mitchell Fain*, lately Colonel with the Army Air Forces, has rejoined the staff of Foster D. Snell, Inc., consulting chemists and engineers of Brooklyn, as account executive in charge of technical development for a group of manufacturers of chemical specialties.

◆

▶▶▶ New executives of The General Detroit Corporation, Detroit, Michigan, are *Robert Leggat-Weir*, assistant sales manager, and *Preston W. Wolf*, assistant sales promotion manager. Mr. Leggat-Weir has been with the company for two years as assistant to the general manager of the extinguisher division, and Mr. Wolf joined the company after his discharge from military service in March, 1945.

◆

▶▶▶ The retirement of *Henry T. Eaton*, vice president of Crocker, Burbank & Company, and manager of the New York office, has been announced. In the paper industry for over forty years, Mr. Eaton was a former partner in Clarke & Company which was absorbed by Crocker Burbank in 1938.

NECROLOGY

EDWARD H. MAYO

Recognized as a pioneer in the manufacture of sulphate pulp from Southern pine, Edward H. Mayo, of Mobile, Alabama, passed away suddenly March 31, at the age of 77.

A native of Maine, Mr. Mayo worked in the woods as a boy and during his youth had every opportunity to see the pulpwood cut and follow it to the mills where it was ground into pulp and made into paper. Boyhood impressions went so deep that when the boy became a man he followed the pulping of wood as his life's work.

It was at Orange, Texas, in 1911 that Mr. Mayo produced his first successful batch of sulphate pulp from yellow pine after a long period of experimentation. Two years later he became manager of the Southern Paper Company plant at Moss Point, Mississippi. When the Southern Kraft Corporation took over that plant in 1928, he continued as production manager for all of its southern mills.

Edward H. Mayo

In 1932, Mr. Mayo went to Mobile to live in retirement, but soon afterward he became interested in the Union Paper and Bag Corporation at Savannah, Georgia, and he went there as an official of that company. Subsequently, he again retired, although he continued to serve from time to time as consulting engineer for paper mills in various parts of the country. Five years ago, he helped to establish the mill of the Florida Pulp and Paper Company at Pensacola, Florida.

Surviving are the widow, and a son, Lawrence E. Mayo.

◆

WILLIAM P. FEENEY

An inventor well known in the industry for his Feeney Felt Conditioner, William P. Feeney, passed away at his home in Appleton, Wisconsin, April 6. He had resided in Appleton since his retirement from business eleven years ago. He was 70 years of age.

Surviving are the widow, two daughters; one son, William John Feeney, of Tacoma, Washington, and a foster son, Ralph Moynihan, of Detroit.

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JEAN RAYMOND HOPKINS

Well known in the trade and in advertising circles, J. R. Hopkins, advertising manager of the Chicago Belting Company, Chicago, passed away April 1 at his home in Deerfield, near Chicago. He was 57 years of age.

Mr. Hopkins was one of the founders and the first president of the National Industrial Advertisers Association, and he was active in the work of the American Leather Belting Association.

In his personal life, Mr. Hopkins was widely acclaimed as a horticulturist. He gave special attention to the culture of various gladioli, and several years ago he won national prominence for his work in breeding a special black gladiolus.

He is survived by his widow.

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▶▶▶ The president and general sales manager of Heppenstall Company (Pittsburgh, Pa., and Bridgeport, Conn.), *Lee A. Daines*, passed away March 29 in Miami, Florida. He is survived by his widow, a son and a daughter.

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▶▶▶ *Arthur F. Allen*, assistant manager of the International Paper Sales Company, Inc. (newsprint selling division of the International Paper Company, New York City), passed away on March 31 in Atlantic City, New Jersey. His widow and a daughter survive.

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JAMES S. WEMYSS

A pioneer in the processing and manufacture of tissue paper products, James S. Wemyss passed away April 10 at his winter home in Florida. He was 67 years of age.

Mr. Wemyss was president of three paper companies: Rushmore Paper Mills Company, Gouverneur, New York; Wyoming Valley Paper Mills, Northumberland, New Hampshire, and the Groveton (New Hampshire) Paper Company. He also was treasurer of the Rushmore company, and treasurer of Lot Biners Pulp and Paper Company, Danville, Quebec.

A widow, a daughter and a son survive.

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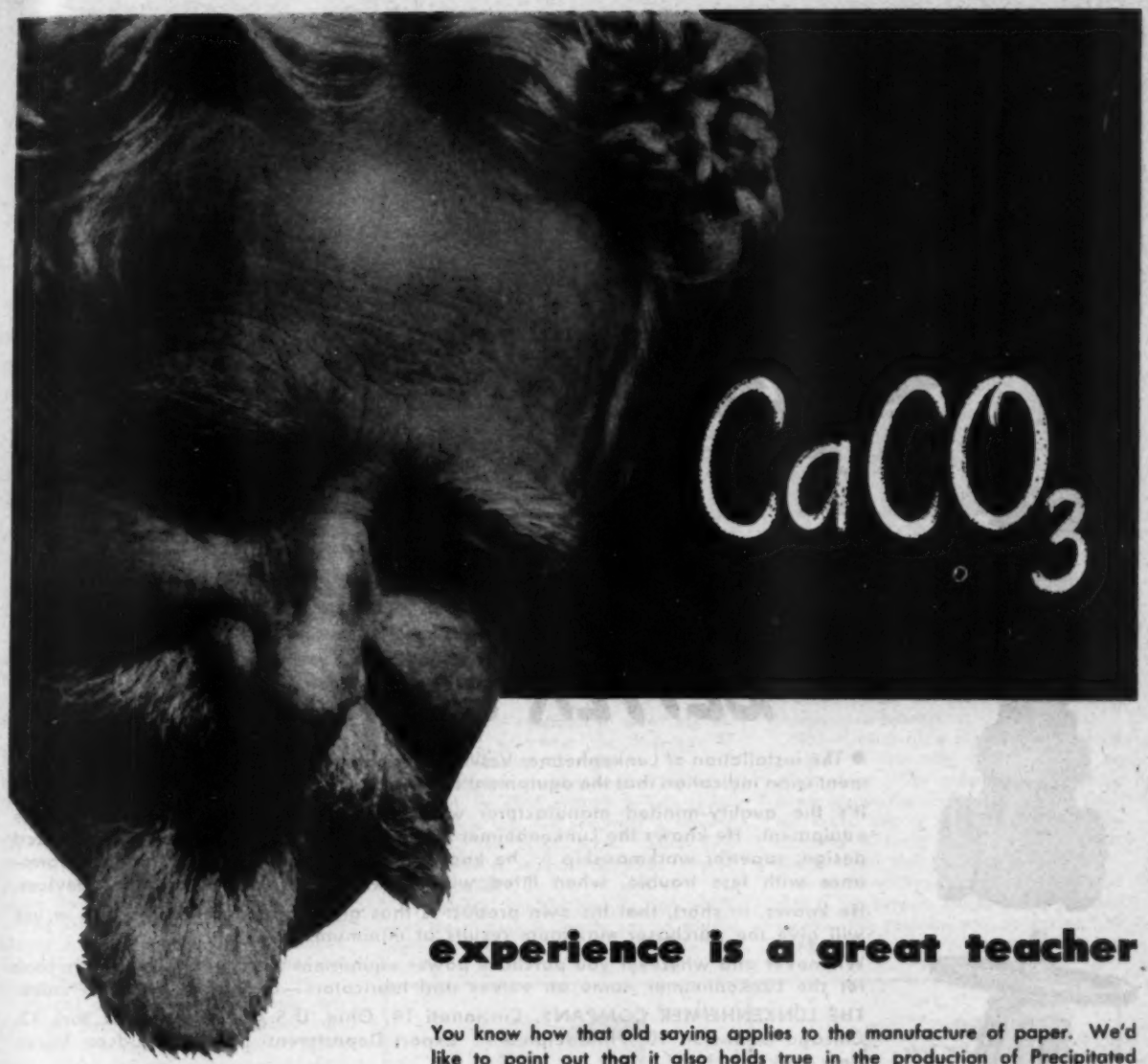
▶▶▶ *Edward J. Finkbeiner*, a vice president of American Car and Foundry Company, passed away on March 23 at his home in East Orange, New Jersey. Mr. Finkbeiner had been with this company for forty-two years. His widow survives.



experience is a great teacher

You know how that old saying applies to the manufacture of paper. We'd like to point out that it also holds true in the production of Precipitated Calcium Carbonate.

For many years Wyandotte Chemicals Corporation has made a *business* of producing Precipitated Calcium Carbonate. The result is a great fund of knowledge and a high degree of expertness.

The paper industry benefits by this "know how" at Wyandotte. The production of high-grade *coated paper* — at the speed demanded by modern conditions — calls for the use of a Precipitated Calcium Carbonate. And Wyandotte Precipitated Calcium Carbonate has no superior.

If your production plans include quality coating, get acquainted with Wyandotte Precipitated Calcium Carbonate. Note its brightness and freedom from grit and abrasiveness . . . its hiding power and ink absorption . . . its uniformity, essential to paper coating.

You'll find that Wyandotte Precipitated Calcium Carbonate meets your most exacting requirements.

Technical bulletins are available upon request.

Wyandotte
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WYANDOTTE CHEMICALS CORPORATION
MICHIGAN ALKALI DIVISION • WYANDOTTE, MICHIGAN

Soda Ash, Caustic Soda, Bicarbonate of Soda, Calcium Carbonate, Calcium Chloride, Chlorine, Hydrogen, Sodium Zincates, Aromatic Intermediates, Dry Ice, Other Organic and Inorganic Chemicals

Fig. 2125 Bronze Gate

you know you're buying BETTER EQUIPMENT

● **The installation of Lunkenheimer Valves, Lubricators, or Air Devices on power equipment is an indication that the equipment itself is of *superior construction and efficiency*.**

It's the quality-minded manufacturer who selects Lunkenheimer products for his equipment. He knows the Lunkenheimer reputation for correct engineering, advanced design, superior workmanship . . . he knows his equipment will give better performance with less trouble, when fitted with Lunkenheimer Valves or other devices.

He knows, in short, that his own product is thus given added salability, and in use will give the purchaser maximum results at minimum cost.

Whenever and wherever you purchase power equipment units, you'll be wise to look for the Lunkenheimer name on valves and lubricators—a *positive guide to value*.

THE LUNKENHEIMER COMPANY, Cincinnati 14, Ohio, U.S.A. (Offices: New York 13, Chicago 6, Boston 10, Philadelphia 7. Export Department: 318-322 Hudson Street, New York 13, N. Y.)

Fig. 1430 Iron Body Gate

Gate Fig. 16 "Renewo" Globe

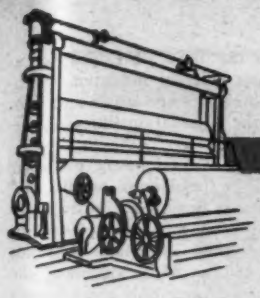
Perhaps YOU Have A Product That Can Be Given This Added Sales Advantage. If your products require the use of valves, lubricators, air devices, or boiler mountings, the name Lunkenheimer on such equipment will provide extra sales appeal. For further information see your nearest LUNKENHEIMER DISTRIBUTOR.

Fig. 1834 "Alvor" Constant Level Oil Control

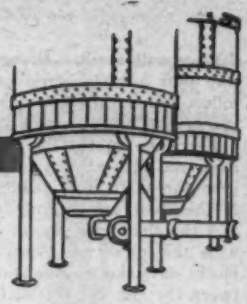
Fig. 1571 Air Cock 150 Lb. Pressure

LUNKENHEIMER VALVES

BRONZE, IRON, STEEL, AND CORROSION RESISTANT ALLOY VALVES
AIR DEVICES, LUBRICATORS, AIRCRAFT FITTINGS



Practical SHORTS



Readers are invited to submit short, practical articles for this department. The items should be original and should relate to ways and means of handling production and maintenance jobs. Where possible, articles should be illustrated. Rough sketches only are required. Payment will be made for acceptable items upon publication.

Fuses Give Warning When Contact Is Poor

If a fuse has been making good contact in the fuse clips, it will be indicated clearly by the contact terminals (the caps of 0-60 ampere cartridge fuses, the blades of 70-600 ampere fuses or the bottom contact of plug fuses).

If the contact has been tight, very little if any air can get to the portions that were making contact. Hence, very little if any oxidization could occur and, therefore, the portions that were making contact will be clean and bright.

If, however, the contact has been poor, air gets to the contact surface and the heating of the fuse then causes oxidation which is shown by the discoloration of the contact surfaces.

No matter how badly a fuse might be heated, there will be a clear, non-oxidized space, or only slightly oxidized space, if good contact has existed.

When only one end of the fuse has the contact surface badly oxidized, you have a positive indication as to where the poor contact exists, namely, at the end where the discoloration has occurred.

The oxidization or discoloration of the bottom contact on a plug type fuse indicates poor contact due to the fuse not having been screwed down tight.

Washer or end ring on a ferrule contact fuse burned or partially melted indicates that the cap was not screwed down right. If the cap had been screwed down tight so as to give the right kind of contact on the link, this result could not possibly be obtained.

Charring of the ends of fiber tubes on *one-time* fuses or *renewable* fuses *always* indicates poor or inadequate contact.

In a properly designed fuse, it may be due to improper renewal or overfusing, or it may be due to abuse or lack of proper attention to fuse clips and fuse blocks. In a poorly designed fuse it may be due to an inherent defect in the design of the fuse case.

When only one end of the fuse is charred, you have a positive indication as to where the poor contact exists; namely, at the end where the charring has occurred.

Charring of the ends of the fiber bar in a renewable fuse *always* indicates poor contact even though the fiber tube is not already charred. If the poor contact is continued, the fiber tube also is sure to become charred.

With good contact the bar in a renewable fuse will never be charred at the ends, irrespective of what kind of a load is applied, unless the fuse is renewed to a greater capacity than it was designed for.

Some cartridge fuses will not show charring of fiber even though the contact is poor. That is because they are built to open the circuit whenever excess heating occurs. This is a distinct advantage as it warns that poor contact trouble exists long before heating from the poor contact can do material damage to the switch or panelboard or fuse clips.—Adapted from data of BUSSMANN MFG. CO.

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How to Remove an Antifriction Bearing from Shaft

Wash off the bearing housing, taking care to keep loose dirt from getting into the housing.

Take a few moments to study the assembly and determine the best way to undertake bearing removal.

Be careful to avoid damage. The bearings may be good enough to use again.

The best tool for removing a bearing is usually an arbor press. Most field work, however, is done with some form of bearing puller.

Remember that the bearing ring which does the turning is usually put on with a tight fit. The stationary ring, like the inner ring of a front wheel bearing, is usually loose. Since the wheel hub revolves, the outer ring or cup is tight in the hub bore.

When a piece of equipment is taken apart, the bearings stay with the member to which they are tightly fitted. In the case of bearings, which are made with separable parts—inner ring, outer ring and ball or roller assembly—both rings may often be a tight fit.

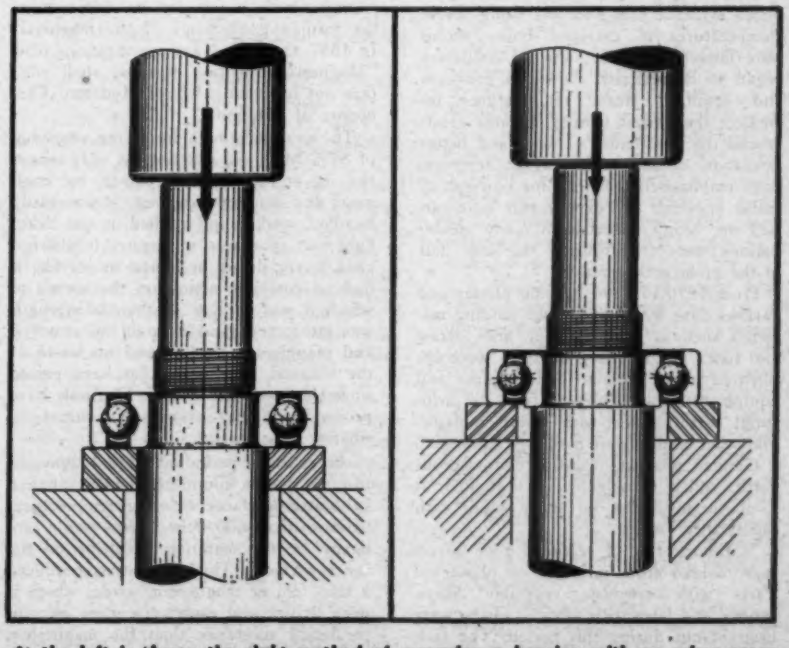
To remove a bearing, press or pull wherever possible only on the ring which is tight.

Press or pull straight and square to keep ring from cocking which might score the shaft or housing and could damage the bearing.

Never press or pull against bearing shields or separators.

The pictures show the right and wrong methods of removing a bearing with an arbor press. The press ram is pushing down against the shaft on which the bearing inner ring is tightly fitted, but the stripping is being done by the support blocks under the rings.

Note, as shown in the *wrong* method that if the support blocks are spaced too far out the pressure will be against the *outer ring* or shield if one is present and



At the left is shown the right method of removing a bearing with an arbor press. Blocks contact inner ring—or both rings if bearing is flush faced. The wrong method is shown at right. Blocks contact the bearing outer ring only.

damage will result. Doing it the wrong way puts a heavy stress on the balls or rollers which can injure them and cause indentation of both races.

Keep the press table and the blocks clean and square. Provide some means to keep the shaft from falling to the floor. If the shaft and bearing are very large and the shaft end cannot be squared up with the press ram, turn up two steel blocks to make a self-aligning fixture between the ram and the shaft. Protect the end of the shaft with a pad of lead, copper or other soft metal.

Use pullers properly. Set them up so they will push or pull straight and square. Take care not to damage shaft threads, keyways or shoulders in the process.—ANTI-FRICTION BEARING MANUFACTURERS ASSOCIATION, INC.

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Thermal Insulations in Industry

In the latter part of the eighteenth century, when steam power was first being applied to industrial uses, there was apparently no effort made to conserve heat losses from bare pipes and equipment. In fact, there seemed to be little realization of the losses involved. Fuel was relatively cheap and the cost of the power obtained from the crude steam equipment was low as compared to the other sources of power that were in use at that time. It is not surprising that heat losses and thermal efficiencies, as such, were completely unknown.

Coverings on these early steam engines and pipes were first applied for the purpose of protecting workmen from burning themselves on the heated surfaces and to reduce temperatures in the engine rooms. Wrappings of rags and similar materials were put on steam lines, and boilers were daubed with clay.

The use of these covering materials produced evidence that fuel was being saved. Temperatures in cramped boiler rooms were lowered and the value of insulation began to be realized. As steam pressures and resulting steam temperatures increased, the "profit motive" became greater and the desirability of more and better insulation obvious. The higher temperatures emphasized the need for non-inflammable materials and experiments were carried on. Many materials in many combinations were tried during the first half of the nineteenth century.

From 1870 to 1890 gypsum plaster and various clays were mixed with binding materials such as sawdust, rope fiber, straw and hair. The resulting mixtures were applied in plastic form to boilers, pipes and equipment. Then different types of infusorial earth, mixed with water, molasses and other binders were used. Around 1880 a German product, made of diatomaceous earth, called *Kieselguhr*, was applied as a plastic insulation on steam pipes with satisfactory results.

Various forms of sectional pipe coverings molded from mixtures of plaster of Paris with sawdust, vegetable fibers, sponge and later with asbestos fibers, were brought out during this period. The fact, now well known, that the insulating efficiency of a material is directly related to the size of the enclosed air spaces was just being recognized. Several forms of laminated coverings made from wrapped layers of felt or asbestos paper were introduced, and ground sponge in plaster of Paris was used as an insulating material at about this time. The sponge served both as a binder and as a means of forming the desirable minute air spaces in the molded coverings.

The initial insulating efficiencies of some of these early coverings were reasonably high, but they lacked mechanical strength and were subject to shrinking, charring and rapid general deterioration. Replacements were frequent and where plaster of Paris coverings were used on iron or steel, rapid rusting of the metal resulted, especially in the presence of moisture.

During the early 1880's, Hiram N. Hanmore, of Philadelphia, conceived the idea of using carbonate of magnesia as an insulating material. What first prompted him to experiment with what was then but a drug store staple, is not definitely known, but a U.S. patent was granted to him on April 15, 1884, covering the use of carbonate of magnesia in conjunction with silk fibers as an insulation on vessels containing water and other fluids.

The first commercial application of magnesia insulation was made by Mr. Hanmore in the plant of the Franklin Sugar Refining Company of Philadelphia. The material was applied in plastic form and it gained immediate favor. Other installations of this remarkable new material soon followed, and a few years later molded magnesia pipe coverings and blocks were produced. For obvious reasons, asbestos fibers were soon used instead of silk fibers. Experimentation with the magnesia and asbestos fibers developed the fact that from 10 per cent to 15 per cent of fiber was ideal for the purpose. This proportion resulted in satisfactory mechanical strength with practically no decrease in the insulating efficiency of the magnesia. In 1887, the U.S. Navy specifications read "Magnesia Insulation material shall contain not less than 85% of Hydrated Carbonate of Magnesia"

The unusually high insulating efficiency of 85% Magnesia was not the only reason for its enthusiastic acceptance by engineers and maintenance men. It was easily handled, worked and applied; it was clean, light and inorganic in nature; it did not char, burn, shrink or loosen in service; it had no corrosive action on the metals to which it was applied; mechanical strength was satisfactory and it could be removed and reapplied with ease and no waste of the material. The years that have passed since the invention of 85% Magnesia have proven its ability to maintain initial insulating characteristics.

At an early period of 85% Magnesia's history, it was found that when applied to heated surfaces carrying temperatures of more than 600 Fahr., there was a tendency for the material to calcine on the inner surfaces. This calcination produced a thin film of magnesium oxide, which is even lighter and possibly a more efficient insulating substance than the magnesium carbonate. However, magnesium oxide is not quite as strong mechanically as 85% Magnesia, so the need developed for a protective inner layer of insulation which would stand higher temperatures and thus preserve all the unusual qualities of the 85% Magnesia.

Several years of development produced high temperature insulations of diatomaceous silica which functioned satisfactorily at temperatures up to around 1900° to 2000° F. Since these insulations were not quite as efficient as 85% Magnesia, the applied thicknesses were only great enough to assure an inter-face temperature of not over 600 Fahr. These high temperature insulations are now produced in pipe sections, block and cement, the same as 85% Magnesia, and are normally used as an inner layer to protect the 85% Magnesia from calcination.

The best of these high temperature insulations usually consist of precalcined diatomaceous silica, suitably graded asbestos fibers and certain bonding agents. A low percent of shrinkage at high temperatures is a most important requisite of this inner layer insulation.

The development and improvement of thermal insulations for use on steam generation, distribution and power equipment has had some highly important effects in a number of other industrial fields. For example, there are today many process industries that could not function without the insulations that hold critical process temperatures within close tolerances. In such cases the value of the heat saved is frequently secondary in importance to the accuracy of temperature maintenance.

The enormous amount of experimentation and research that has been done by the manufacturers of insulations as well as by engineering societies, technical schools, insulation engineers and various research organizations, has resulted in a great variety of new insulating materials and a wealth of technical and scientific insulation data. The new insulating products that have been developed are, in practically every case, special materials for special purposes. None of these new insulations has taken the place of 85% Magnesia, or of the combination of diatomaceous silica materials with 85% Magnesia, for general industrial use.

Thermal insulations and their proper use are of ever increasing importance to business and industry. With fuel, power and labor costs tending steadily upwards, small economies become significant. As boiler and process temperatures continue to increase and refrigeration temperatures decrease, insulations are relied upon to minimize losses.—MAGNESIA INSULATION MANUFACTURERS ASSOCIATION.

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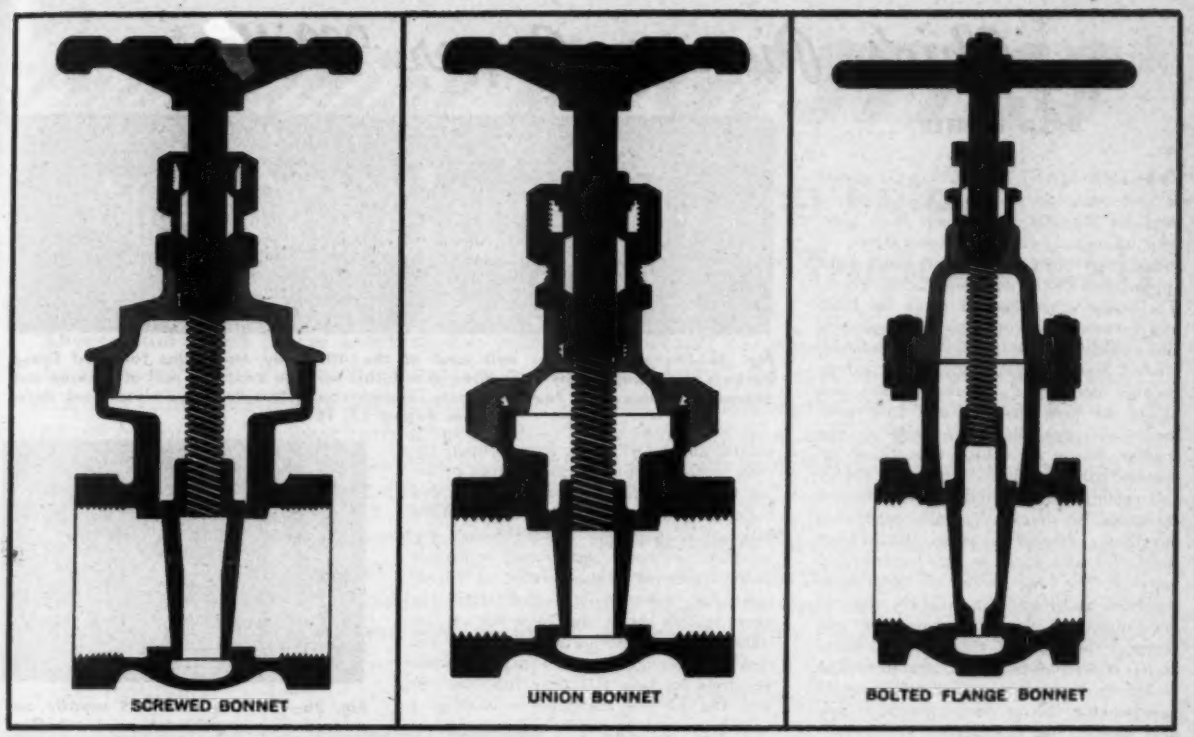
Different Methods of Attaching Bonnet to Body of Valve

There are three types of bonnet; namely, screwed, union, and bolted flange. The characteristics of these are as follows:

Screwed Bonnet. The outside of the bonnet and the inside of the neck of body are threaded. The bonnet is then screwed into the body neck. This type is widely used, as it is the least expensive design to construct. However, screwing the bonnet into the body neck to make a tight seal



has a tendency to spread the neck. This makes it more difficult to make a tight seal again after the valve has been taken apart for reconditioning.

Union Bonnet. This construction affords the same tight seal as a ball joint union. The bonnet and the neck of the body are brought together in a ground joint connection and tightly sealed by means of a heavy hexagonal ring nut. Since no friction is created on the faces of the connection, the bonnet can be taken off and tightly sealed in place again any number of times without spreading the neck of the body. Moreover, pressure entrained in the body tends to hold the ring nut tight to the body neck. With this type of construction, it is always easier to make and maintain a tight seal between bonnet and body than with a screwed-in bonnet.

Bolted Flange Bonnet. This is the simplest, most rugged type for larger size valves where there is sufficient room for the necessary flanges, bolts and nuts. The construction is shown in the sectional view illustrated.—THE WM. POWELL CO.

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Acetylene Cylinders—Their Handling and Use

General

1. Acetylene is a fuel gas which is capable of burning or causing explosions. Care shall be exercised that it is not permitted to escape and collect in rooms or confined spaces.

2. Acetylene is stored in cylinders filled with liquid Acetone. The Acetylene is absorbed in the Acetone liquid. Do not attempt to withdraw Acetylene from a cylinder lying in a horizontal position or do not withdraw Acetylene rapidly. Either condition causes Acetone, the protective liquid, to be withdrawn from the cylinder.

3. Inspect cylinders for evidence of overheating. If overheating is observed evacuate all persons from the area and spray water on the cylinders from a safe location, if possible.

4. Acetylene combines with copper to form an unstable compound. Do not use apparatus on acetylene work which is constructed of Red Brass or Copper, except for tips.

Storage

1. Acetylene cylinders shall be stored with valve end up.

2. Acetylene cylinders shall be stored in a well-ventilated, protected, dry location, not in the vicinity of other inflammable materials such as oil, gasoline, packing materials, waste, etc.

3. All acetylene cylinders are provided with fusible plugs at top and bottom, which melt at the temperature of boiling water. If for any reason the cylinder is heated above a safe limit the fusible plugs melt, thus letting gas escape from the cylinder. Therefore, acetylene cylinders shall be stored in a cool place and shall never be located near furnaces, radiators, or other sources of heat.

4. If the cylinder or valve becomes covered with ice, it is NOT safe to thaw the ice away by using steam or boiling water. Never use a torch or flame for this purpose. Transfer the cylinder indoors and permit the ice to melt gradually. If it is desirable to speed up this operation, warm water may be applied to the valve only.

Use

1. Acetylene shall not be removed from cylinders without first attaching a regulator.

2. When removing acetylene from cylinder, it shall stand vertical, with the valve end up.

3. The cylinder valve should be opened slowly

4. Cylinders shall be secured to prevent falling over.

5. For most work it will not be necessary to open the acetylene cylinder valve more than one-third of a turn of the spindle. In no case shall the cylinder valve be opened more than one and one-half turns.

6. A special "T" or "L" wrench, as furnished, shall be used for opening the acetylene cylinder valve. It shall be left in the place on the valve stem at all times while the cylinder is being used in order that the valve may be quickly closed in case of emergency.

7. No tools, clothing, etc., shall be placed on the top of acetylene cylinders as they may damage the safety plugs or interfere with rapid closing of the cylinder valve.

8. If acetylene is withdrawn from a cylinder too fast, acetone will be withdrawn with the gas. It is safe to withdraw acetylene from a cylinder at a rate of not exceeding one-seventh of its contents per hour. Stated in other terms, a full cylinder of acetylene should last for at least seven (7) hours of continuous use before it is empty. If it is necessary to use acetylene at rates exceeding this value a manifold should be utilized.

9. Operators shall not attempt to transfer acetylene gas from one cylinder to another nor to mix other gases with it in a cylinder.

10. When a cylinder is exhausted, the cylinder valve shall be closed and the cap replaced.—*Safety for Gas Welding, Cutting, and Brazing Operators,* GENERAL ELECTRIC CO.

Ohio's Pioneer Paper Mills*

DARD HUNTER

▶▶▶ THE MANUFACTURE OF paper in vast quantities and in myriad varieties, used for the making of more than fourteen thousand different commodities, is today taken for granted with but slight appreciation of the marvelous achievement. The unconcerned layman reads his Bible and peruses his favorite books, magazines, and newspapers; he handles daily the crisp United States currency, he writes letters, cheques, deeds, and promissory notes, and finally he pens his last will and testament—all upon sheets of paper. The average person gives little thought or reflection to the almost 2000-year history and evolution of this indispensable fibrous substance he so casually calls *paper*—an appellation derived in archaic times from the Greek and Latin words, *papuros* and *papyrus*. The long history of paper is as involved and interesting as the age-old development of glassmaking, weaving, and ceramics, but, unlike these more colorful crafts, it receives but scant attention. The recording of the history and technique of papermaking in our own country in pioneer days is meager indeed.

True paper had its beginning in China, within the ancient walled city of Lei-yang, Hunan Province. Here the eunuch Ts'ai Lun, a member of the Imperial Guard, about 105 A.D., formed upon porous molds the first sheets of paper by using the beaten fibers of cast-off rope and the tattered remnants of woven cloth. The making of paper is a simple and elementary process: macerated vegetable fibers suspended in pure water are floated upon flat, woven molds which retain the fibers in thin sheets and allow the surplus water to drain through the meshes of the molds. The most modern paper-machine performs precisely this same function, but with the machine the paper is made in a continuous web or reel, while with the use of hand molds each sheet is formed separately and individually. The huge Fourdrinier paper-machine and Ts'ai Lun's hand molds have much in common—the principle of fiber formation is exactly the same in both instances.

From China the craft of making paper traveled slowly over the old caravan routes to Samarkand, on to Baghdad, and to Damascus and Cairo; then along the Mediterranean to Morocco and finally into Spain in 1150 A.D. By 1275 paper was being made in Italy; France in 1348; Germany in 1390, and in England a century later. The first paper to be made in the New World was formed in Culhuacán, Mexico, by Spaniards, in 1575; in our own country the earliest paper was produced in 1690, near Philadelphia, Pennsylvania. The skilled pioneer artisans of the American colonies gained their rich traditions and their craftsmanship in papermaking in the mills of Germany, the Netherlands, and England.

The pioneer papermaking state of the colonies was Pennsylvania and many of the workers who went by wagon over the Allegheny Mountains had learned the duties of vatman and coucher in the paper mills of Bucks, Chester, Delaware, and Montgomery Counties. (Fig. 1—shown in original article, but omitted here.) The earliest paper manufactory in the "western country" was set up in Georgetown, Kentucky, in 1791, and by March 1793 usable printing and writing paper was being made. This mill was under the sponsorship of the Reverend Elijah Craig, a Baptist minister who also operated a fulling mill, a hotel, a general store, and a tavern which was bountifully supplied with good Kentucky liquor from the Reverend's own distillery. Elder Craig was

(All illustrations of watermarks are shown in reduced size)

Fig. 2—The paper made by Craig, Parkers and Company, the pioneer mill of Kentucky (1793), was watermarked with the letters C & P on half the sheet (a), and a well-formed eagle (b) on the opposite half. These two watermarks were photographed from a sheet of "laid" letter paper dated August 10, 1810

Fig. 3a—The second paper mill west of the Alleghany Mountains followed Craig, Parkers and Company by only three years. This was the Redstone mill of Jackson and Sharpless, Brownsville, Fayette County, Pennsylvania. This Redstone watermark dates from August 11, 1811

Fig. 3b—The initials J & S usually appeared as a watermark on one-half of all sheets of paper made by Jackson and Sharpless, with a dove, beaver, or other design on the opposite half

Fig. 3c—The dove watermark of Jackson and Sharpless, from a deed form printed by John W. Browne, of Almanac fame, at his office of Liberty Hall, Cincinnati, Ohio. Deed dated August 10, 1809

Fig. 3d—The crouching beaver was a favorite watermark of Jackson and Sharpless and was always used in connection with the initials J & S. The beaver mark was employed in finely-formed "wove" letter paper, measuring 9¾ by 15½, trimmed

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Industrial LOGISTICS*

reduces cost of handling Pulp through warehouse — pays for Trucks quickly

"There's too much lag in handling our bales of wood pulp," said a big warehouseman during a search for improved methods of getting loads into and out of storage. "We must move them faster—and at less cost, of course. *Can you help?*"

That meant not only handling loads without pallets, but handling them without damage to the individual bales. An Elwell-Parker Truck was purchased, and the District E-P Materials-Handling Consultant began a series of modifications and tests of the supporting blades to suit this particular application.

* The science of assembling and handling all Pulp and Paper Plant loads to insure maximum economies at every stage of (a) Procurement, (b) Production and (c) Distribution, using Elwell-Parker Electric Trucks, Tractors and Cranes;

Employing the correct containers in Master Unit Loads, on Pallets or Skids;

To insure Greater Speed — Faster Production — Greater Turnover — Increased Safety—New Profits.

The result was a blade that could be driven under the 2,000-pound stack of bales without injuring them or disturbing the pile, either when stacking or removing from storage. Further modifications of the blades followed later, as the lading changed in character.

New earnings. The first Elwell-Parker Truck was so satisfactory that the owners soon ordered a fleet of them. Savings really skyrocketed then—they quickly paid for the Trucks during the first year, with further increases as other uses were developed for the equipment.

This is but one illustration of Elwell-Parker's willingness and capacity to aid Executives in creating great new savings in the handling of Pulp and Paper loads—sometimes without precedent.

Many unique Truck and Crane attachments now in general use, such as the Roll-Handler which has revolutionized the production of newsprint, were originated by Elwell-Parker Materials-Handling Consultants in co-operation with the home office Engineering Staff.

Elwell-Parker invites you to search *your* Load-Transportation Cycle for sources of important new savings and profits through applied Industrial Logistics — to call on the E-P Paper-Handling Consultant for co-operation in finding them.

The Elwell-Parker Electric Company, 4241 St. Clair Ave., Cleveland 14, Ohio.

Dial The ✱ Materials-Handling Consultant Today!

ELWELL-PARKER

POWER INDUSTRIAL TRUCKS

Established 1893

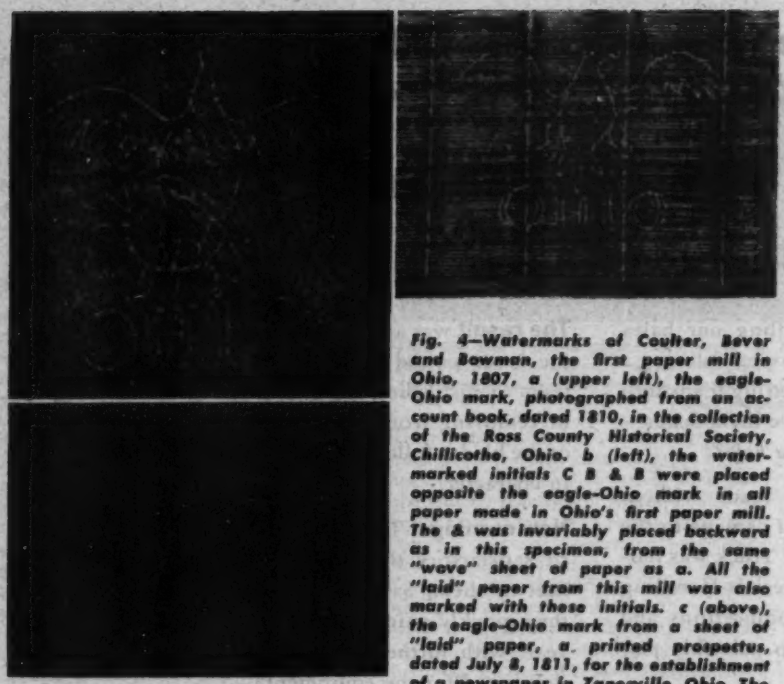

Fig. 4—Watermarks of Coulter, Bever and Bowman, the first paper mill in Ohio, 1807, a (upper left), the eagle-Ohio mark, photographed from an account book, dated 1810, in the collection of the Ross County Historical Society, Chillicothe, Ohio. b (left), the watermarked initials C B & B were placed opposite the eagle-Ohio mark in all paper made in Ohio's first paper mill. The & was invariably placed backward as in this specimen, from the same "wove" sheet of paper as a. All the "laid" paper from this mill was also marked with these initials. c (above), the eagle-Ohio mark from a sheet of "laid" paper, a printed prospectus, dated July 8, 1811, for the establishment of a newspaper in Zanesville, Ohio. The untrimmed sheet is 13¼ by 16-3/16 inches

a man of wealth and influence and usually carried on his activities alone, but in the papermaknig venture he solicited Alexander and James Parker, Kentucky merchants, to become his partners and the paper mill firm of Craig, Parkers and Company was formed (*Figs.* 2, *a and b*).

For several years the Georgtown, Kentucky, mill supplied most of the paper required for printing the books, newspapers, and periodicals of the west, or until the year 1796 when a partial burden of this demand was assumed by the first paper mill in western Pennsylvania. This mill was the undertaking of Samuel Jackson and Jonathan Sharpless who erected their building on Redstone Creek, four miles from Brownsville, Fayette County (*Figs.* 3, *a, b, c, d*). Sharpless was the trained papermaker of the partnership, having gained his knowledge of the craft while working in a paper mill in Chester County, Pennsylvania. The paper produced by the Georgetown Kentucky, and western Pennsylvania "Redstone" mills was carried by wagon and flat-bottomed river boats to the printing shops of Kentucky, western Pennsylvania, Ohio, Tennessee, Indiana, Illinois, and even remote Missouri. The supply, however, was not always equal to the demand as is evidenced by the following notice in the November 13, 1802, issue of the Chillicothe, Ohio, *Scioto Gazette*:

"By reason of the Menongehalia River not having been navigable for some time past, we have been disappointed in receiving a supply of paper from Red-Stone (Jackson and Sharpless), which was contracted for and to have been delivered at the mouth of the Scioto River last month: in order to obtain a supply we sent to the mills at George-Town, Kentucky (Craig, Parkers and Company), but in this effort we were also disappointed, there was not a ream to be had, we have therefore been under the necessity of sending by land to Red-Stone, at a very heavy expense, from whence we shall be furnished in two weeks, our readers will therefore excuse our issuing only half a sheet, during that period. . . ."

As the country beyond the Allegheny Mountains grew in population, printing offices for the production of books, pamphlets, newspapers, and periodicals were rapidly established. The mounting need for paper was urgent and one- and two-vat paper mills were erected in near-by communities. The cost of transporting paper from the east was prohibitive, and even from the Kentucky and western Pennsylvania mills was considerable; time, too, was a dominant factor. In the eastern port cities of Boston, New York, Philadelphia, Baltimore, and surrounding territory it had long been possible to procure paper from Europe, in fact the foreign-made paper was actually preferred. Many of the early books printed in the east were upon paper produced in England, while in the "western country" the major portion of the early books, pamphlets, broadsides, and correspondence was on locally-made paper. The western publications are, therefore, genuinely American and from a technical viewpoint hold more interest than the contemporary imprints of the east.

The enterprise of Jackson and Sharpless in western Pennsylvania had considerable influence upon the establishment of the pioneer paper mill in Ohio. Jacob Bowman of Brownsville, Pennsylvania, John Bever of Georgetown, Beaver County, Pennsylvania—places not far from the "Redstone" mill—and John Coulter of Brooke County, Virginia (now West Virginia), entered into an agreement August 1, 1806, ". . . for the erection of a paper mill near the mouth of Little Beaver Creek. . . ." The earlies mention of this Ohio mill in a contemporary publication appeared in Zadok Cramer's *Navigator* (Pittsburgh 1808), and reads: "Little Beaver Creek, left side. A quarter of a mile below George Town. Near the mouth of this creek are two grist, one saw, and a paper mill erected in 1807-08 by Messrs. Coulter, Bever, and Bowman." This would place the mill in Ohio, near Fawcettstown, now East Liverpool, Columbiana County. The only contemporary description of the building, and the paper made therein, is given in Browne's *Cincinnati Almanac* 1810, following a visit of John W. Browne, the editor, to the vicinity some time previous to 1809 when the *Almanac* was actually printed. Browne's description reads: ". . . the creek is full of large rocks, and affords a romantic scene. About 2 m. up from the mouth is a paper mill, built of stone, and admirably calculated to perform a great deal of business. The paper made at this mill is equal if not superior, to any made this side of the mountains; and there is every reason to suppose, from the attention paid to the manufactory, that a large stroke of business will be satisfactorily carried on. How strange to say, that though there are not less than ten or twelve printing presses in the state of Ohio, yet the only paper mill in the state is situate within one mile of its eastern boundary. . . ."

The paper made in the "Ohio mill," as it was originally named, was of superior grade and specimens preserved in museum collections attest its lasting quality. The material used was linen and cotton rags without the addition of bleach or other injurious chemicals; the product of the pioneer Ohio mill should endure for all time. The watermark consists of a grotesquely drawn eagle with spread wings, the rotund bird clutching a branch, underneath the eagle is the word OHIO in outline letters, also crudely executed. The eagle mark appears on the right half of the paper while the initials C B & B occupy the left side of the sheet (*Figs.* 4 *a, b, c*). The spread of the eagle's wings is about 2¾ inches, but a decided variation in the twisting of the wires makes it possible to determine the number of molds possessed by the mill. For the most part the molds were of the "wove" style capable of forming sheets of paper measuring approximately 13 by 16 inches. Watermarks are formed in paper by applying the twisted wire letters and symbols to the surface of the molds; the linen and cotton pulp naturally lies thinner along the wires, causing transparency.

What was probably the second paper mill within the state of Ohio, following the Coulter, Bever and Bowman mill by only a few years, was the mill of Christian Waldschmidt, son of Simon Waldschmidt, the master of a paper mill in Gengenbach, on the Kinzig, Germany. Young Waldschmidt (anglicized to Waldsmith) emigrated to America in 1786 and was readily accepted as a skilled worker in a paper mill in Montgomery County, Pennsylvania, where many immigrant craftsmen found work. The Ohio Waldsmith mill was established on a bend of

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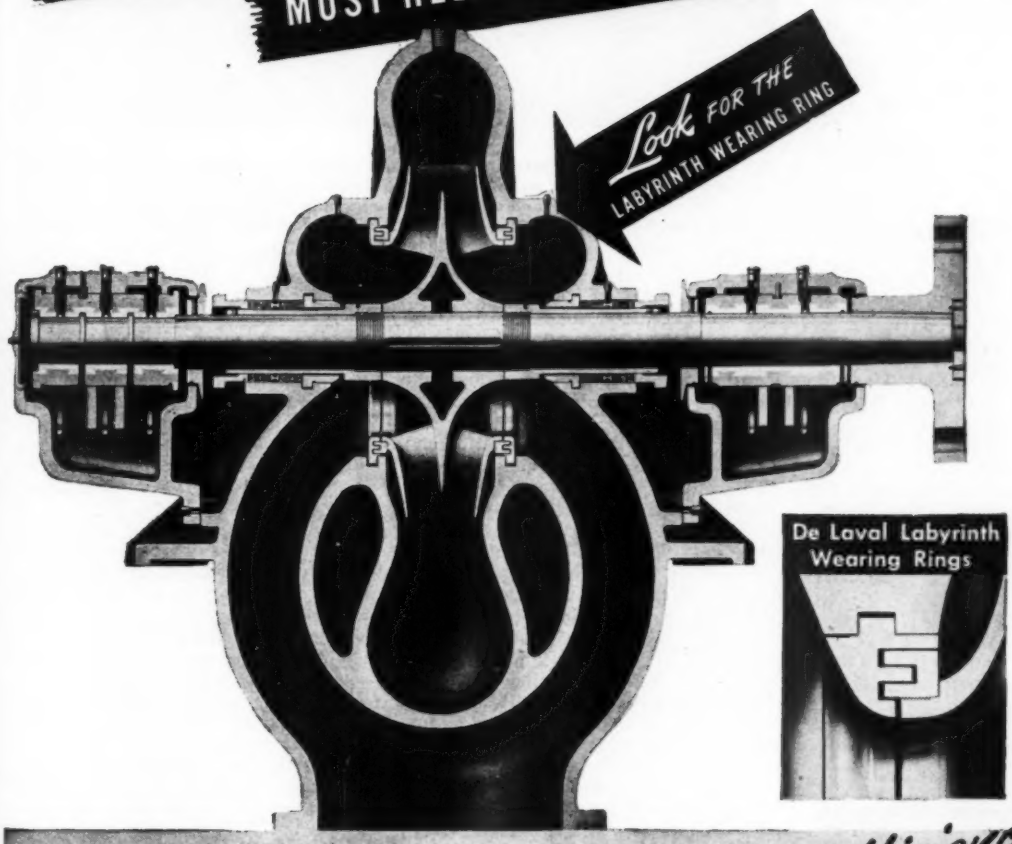

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the Little Miami River, near a locality known as Germany, though during the Civil War the name of the settlement was changed to Camp Dennison. The earliest contemporary mention of this mill may be found in the January 16, 1810 issue of *Liberty Hall*, Cincinnati: "Christian Waldsmith announces his intentions of building a paper mill on the Little Miami River." It was not until a year later, however, that the mill was in actual operation as is evidenced by the following editorial in the *Western Spy*, Cincinnati, January 26, 1811:

Our impression appears for the first time on paper manufactured at Mr. Waldsmith's new paper mill in Sycamore township. Much praise is due to Mr. Waldsmith for his unremitted exertions to furnish the neighboring printers with an early and constant supply. Nothing appears to be wanting to render this establishment of the greatest utility, except the care of the industrious housewife in saving her rags. The ladies of the community are informed that we shall hereafter give three cents a pound for rags in cash, or four cents in books and stationery.

The watermark used by Waldsmith was the single word M I A M I on one half of the sheet of paper with the letters W & Co on the other half (*Figs. 5a, b*). The use of pictorial watermarks such as the dove and beaver of Jackson and Sharpless and the eagles of Craig, Parkers and Company and Coulter, Bever and Bowman had come to an end and commencing with the Waldsmith mill the paper marks assumed the prosaic outline lettering common in watermarks of the present day. Nothing remains of the equipment used in either Ohio mill, but the massive stone house erected by Christian Waldsmith on the *Kleiner Miami Fluss* still stands, an enduring testimony of the good fortune and frugality of this early Ohio papermaker.

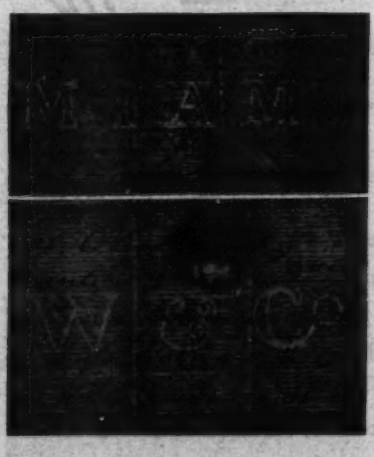

Fig. 5—The photographs (a, b) of the Waldsmith watermark are from the paper used in writing a deed for two of George Washington's "lost lands," from Joseph Kerr to Preston Neville and his sister Amelia Neville Craig, 1811. Original in Ohio Historical Society, Columbus. The Christian Waldsmith Mill, on Little Miami River, near Cincinnati, was probably the second paper manufactory to be established in Ohio, about 1810. The watermark embraced the initials W & Co on one side of the mold and MIAMI on the other half

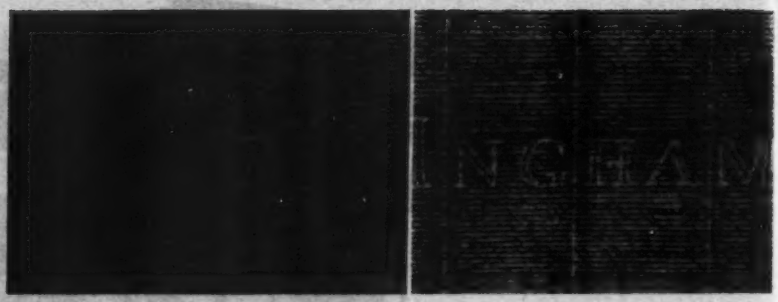

Fig. 6—The watermark of Hezekiah and Isaiah Ingham consisted of the regulation outline lettering with H & I (a) on one-half the sheet of paper and INGHAM (b) on the other. From an account book dated 1813. The Ingham brothers, who introduced papermaking into Ross County, Ohio, in 1812, had learned their trade in Bucks County, Pennsylvania

Although I have long considered the Little Miami mill of Christian Waldsmith as the second paper manufactory to be established in Ohio, it is possible that the mill of the Pitcher brothers in Hocking County, near Lancaster, was erected about the same time. As early as 1800 Rudolph Pitcher settled in Lancaster and was soon joined by his brother Abraham, both natives of Switzerland. The only contemporary record supporting the assumption that the Pitchers actually engaged in papermaking in Ohio is an advertisement in the Chillicothe, Ohio, *Supporter*, March 24, 1810, which reads: "Rags Wanted. The subscribers are erecting, and will soon have completed, a PAPER-MILL: Therefore will give the highest price for CLEAN LINEN AND COTTON RAGS, Also, Linsey and the Swinglings tow of Flax. . .Rudolph Pitcher, Abraham Pitcher, Lancaster, Ohio, March 24, 1810." (The "linsey" mentioned was a mixed cotton and wool cloth and this material, known as "linsey-woolsey," along with the tow of flax, could have been used in connection with linen and cotton rags in the making of paper.) Beyond this meager advertisement of 1810 nothing is known of the Pitcher papermaking undertaking; no watermarks have been found that could be identified as having originated in the Hocking County paper mill.

For more than a hundred and thirty years Ross County, Ohio, has had a worthy history of papermaking. In 1812, David Crouse, whose family had settled in this county in 1798, was erecting a grist mill for his own use on the banks of Kinnikinnick Creek in Green township. The water-power mill was nearing completion when Crouse was visited by two young men from the east, Hezekiah and Isaiah Ingham. The Inghams had been papermakers in Bucks County, Pennsylvania, where they had learned the trade on the Pennyback in the period when their brother, Samuel Delucenna Ingham, had been superintendent of a paper mill. The two younger brothers, determined to carry on the craft of papermaking, pushed west, while Samuel remained in the east. To Hezekiah and Isaiah Ingham, seeking a location for a paper mill in the west, the constant flow of clear water in Kinnikinnick Creek appealed for their undertaking. These two energetic and persuasive young men induced David Crouse to lease the intended grist mill to them for a period of seven years. Here the Ingham brothers produced the finest and cleanest paper that had been made in the state of Ohio. The watermark used by this mill was H & I INGHAM in the regulation outline lettering (*Figs. 6 a, b*).

During the seven years' lease of the mill to the Inghams, David Crouse, the owner of the building, had every opportunity of studying the maceration of the rags, the forming of the sheets of paper upon the molds, the pressing, drying, and finishing; also he could see that the trade was carried on with considerable profit. There was an ever-increasing demand for the well-formed, clean printing and writing paper produced by the Ingham brothers and their eastern-trained helpers. At the close of the lease the astute David Crouse decided to enter papermaking himself and with the workers formerly employed by the Ingham brothers the Kinnikinnick mill was carried on under the Crouse name. The undertaking continued to prosper and during this heyday David Crouse built the substantial, well-designed brick house that still stands not far from the site of the old paper mill. The printing and writing paper fabricated by David Crouse, like that made by the Inghams, continued of superior grade, each sheet proudly bearing the watermark D CROUSE in the familiar outline letters (*Fig. 7*).

The possession of the Crouse mill by the Ingham brothers terminated about 1819, just two years after Thomas Gilpin

Fig. 7—The outline watermark of D. Crouse, the successor to the Kinnikinnick Creek mill of Hezekiah and Isaiah Ingham, who began papermaking in Ross County in 1812. The Crouse mark dates from 1819

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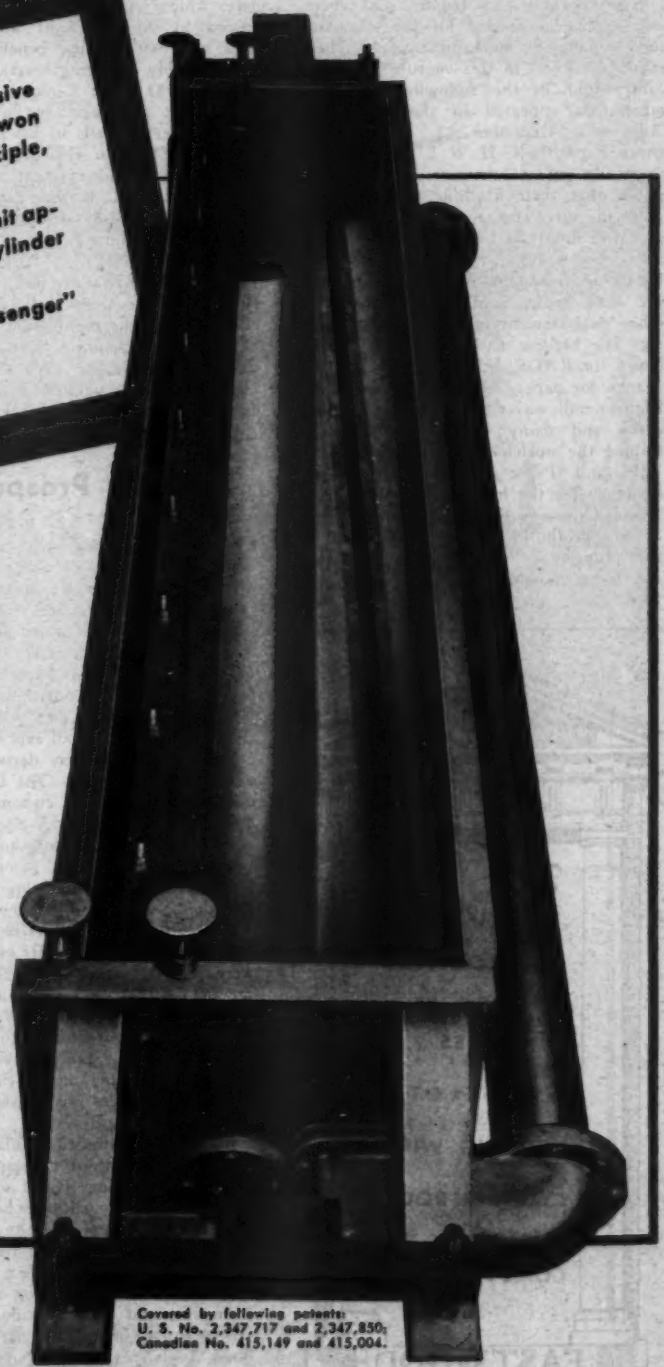

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had put in motion at his mill on the Brandywine, near Wilmington, Delaware, the first paper-machine in America. The Inghams foresaw the futility of building and equipping another handmade paper mill so they moved to Union township, Ross County, and established a combination grist mill and distillery. Their plan was to amass sufficient capital to purchase a paper-machine and acquire the expensive appliances needed for the manufacture of paper by mechanical means. Their eventual success in this venture is significantly told in the following advertisement that appeared in the Chillicothe *Advertiser*, December 11, 1831: "*Machine Paper Mill*. H. & I. Ingham, Respectfully inform their friends and the public that their *Machine Paper Mill* is now in successful operation, and that they will supply at the shortest notice any orders for wrapping or printing PAPER, Upon as reasonable terms as paper of the same quality can be had from any other establishment in the Western country. The highest market price will be allowed for *RAGS*, either in cash or in exchange for paper." The machinery of the Ingham mill was finally moved to Chillicothe and many years later this mill formed the nucleus of the present Mead Pulp and Paper Company. It is not known when the handmade paper mill of David Crouse suspended operations, but at his death in 1837 an appraisal of the property of the mill listed "4 pair old paper moulds" at a value of only fifty cents—the papermachine had indeed triumphed over the old hand process.

In chronological order the fifth paper mill in Ohio was probably in 1815 at Steubenville, Jefferson County. This was, of course, a mill for making paper by hand. Of the Jefferson County mill, Zadok Cramer in his *Pittsburgh Almanac* (1815) says: "Steubenville. . . a steam paper mill with three engines is erecting here, which will be shortly in operation, owned by Messrs. Scott and Bayless." This mill, without the benefit of steam, was probably operating several years previous to 1815, but Cramer's notice was the earliest contemporary mention. William Cooper Howells in his book, *Recollections of Life in Ohio*, gives the year 1813 as the commencement of the Scott and Bayless mill. If this date is correct the Jefferson County mill and the Ingham mill of Ross County began about the same time.

The Jefferson County mill is of particular interest to present-day artists and craftsmen for the reason that it furnished paper used in printing the wall hangings designed by Thomas Cole *(1801-1848)*. Cole's father emigrated from Chorley, England, to Steubenville, Ohio, in 1819, and began the decorating of paper for use on the walls of the houses of the well-to-do settlers. Young Cole cut the woodblocks, mixed the colors, and printed the papers, each sheet separately as was necessary previous to the introduction of the paper-machine with its continuous web of paper. Thomas Cole's later achievement as founder of the Hudson River school is better known than his early efforts. In later years the Steubenville paper mill was acquired by Messers, Holdship, Hanna and Turnbull who in 1830 published the little volume known in every elementary school "beyond the mountains" as *The United States Spelling Book*, with the unique imprint on the title page, *At the Clinton Paper-mill*.

Although Ohio was not originally settled until the late eighteenth century, a paper mill was in operation as early as 1807. This was but forty years after the first paper mill was established in Connecticut; only thirty-four years following the earliest mill in New York State; fifteen years after the first paper was made in New Hampshire, and twelve years later than Vermont's pioneer papermaking.

Finland's Prospects for Forest-Products Exports

ROBERT P. DONOGH*

▶▶▶ In prewar years the forests of Finland were the basis of nearly 85 per cent of that country's total exports. Shipments of lumber, mine timbers, plywood, and spools in 1938 were valued at 3,361,000,000 Finnish marks ($71,000,000) or nearly 40 per cent of exports, and those of pulp, paper, and board, at 3,458,000,000 Finnish marks ($74,700,000) or about 41 per cent of all exports, and some other export items were derived from the wood of the country. The United Kingdom was the principal customer for wood goods, although Germany also was an important market. For pulp and paper, the United States was the second most important customer, following the United Kingdom, whereas Germany took only 97,000,000 Finnish marks worth of these articles. The 1938 exports of wood goods were relatively small, and pulp and paper exports in that year failed to reach the record set in 1937. Russia has taken very small quantities of Finnish forest products in recent years. Only a relatively small part of the output of the Finnish forest-products industries was consumed domestically.

By the 1944 armistice Finland lost more than 12 per cent of its standing timber, but that remaining is said to be in good condition. Every effort is being made to utilize these assets—despite the loss of more than 20 per cent of the capacity of the country's forest product industry—in order to restore production in the export industries and thus provide commodities to exchange on world markets for the food, fuels, textiles ,and other materials and manufactures essential to the economy of Finland.

Production Capacity

The Finnish pulp industry had been developing steadily before the war. Production of the chemical-pulp industry rose from 704,521 metric tons (air-dry basis) in 1930 to 1,474,489 tons in 1937. The latter figure comprises 1,036,532 tons of sulphite pulp (of which 325,000 tons was bleached) and 437,957 tons of sulphate pulp (including 58,142 tons of bleached). At least one important mill, having an annual capacity of 90,000 tons of sulphate pulp, entered production later. In 1939 (during the last month of which year Finland was already at war) chemical-pulp production was much lower. Production of mechanical pulp increased from 371,352 metric tons in 1930 to 716,082 tons (air dry weight) in 1937. Paper production showed a similar increase.

The theoretical productive capacity of the prewar Finnish chemical-pulp mills was estimated to exceed 1,800,000 tons per annum, of which more than 1,100,000 tons was sulphate pulp. Mechanical-pulp mills were estimated to have an annual actual capacity in excess of 680,000 metric tons.

The pulp industry was based on domestic materials, but certain imports were, however, absolutely essential to its efficient operation. The industry, at the outbreak of war, was highly modernized, and had proceeded far in the elimination of waste. War damage to the mills now remaining to Finland was not extensive, but the armistice considerably reduced Finland's total pulpwood reserves.

Accurate details concerning the pulp capacity lost by the terms of the armistice of 1944 are not available, but the Karelian

(*) European Division, Office of World Trade Promotion, Department of Commerce (Based on a Report from Vice Consul Walter W. Hill, U. S. Legation, Helsinki). Reprinted from Foreign Commerce Weekly, March 23, 1946.

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area ceded to Russia is estimated to contain mills with the following rated capacities (in metric tons): Sulphite pulp, 257,000; sulphate pulp, 133,000; mechanical pulp, 20,000; board (not including wall board), 40,000.

According to one unofficial estimate, the present Finnish chemical-pulp capacity is theoretically now about 1,400,000 metric tons, but because of various adverse factors, many months will be required before production can reach this figure. For the first three quarters of 1945 chemical-pulp production is said to have been about 336,000 metric tons.

Mechanical-pulp mills now have a capacity (dry-weight basis) of approximately 355,000 metric tons of wet pulp and 62,000 tons of dry pulp. Production of mechanical pulp, for sale only, during the first three quarters of 1945 has been unofficially estimated as only about 69,000 metric tons. However, only a small part of mechanical-pulp production falls in the "sale" class, and in consequence total production must have been far more than the foregoing figure, inasmuch as exports of 170,000 tons of pulp and board were planned.

Finnish pulp mills were further developed and modernized during the war. The Kanto system of chip selection is being applied, as well as the Nichols-Freeman pyrite-roasting process. Domestic pyrite is now used by most of the mills. Several mills have increased their drying capacity, and bleaching departments have been improved. One mill has been converted to the production of rayon pulp exclusively, and another can do likewise should the need arise. There has been a trend toward production of high-alpha pulp, and four mills can now produce pulp with an alpha-cellulose content of 93 to 94 per cent, and one mill has attained 96 per cent alpha-cellulose content. Several paperboard mills have been equipped to use larger quantities of chemical pulp and waste paper.

The Finnish pulp industry has two principal (and interrelated) problems to solve —supplies of pulpwood must be increased, and, if it is not to be used as fuel (thus preventing the establishment of requisite stocks), coal must be imported. The fuel aspects of the situation are inseparable from its pulpwood aspects, and are closely related to the saw-timber supply problem and the general fuel situation in Finland. When fuel supplies become low, all wood, regardless of grade and purpose, must of necessity be burned and the forests exploited ruthlessly.

Forest Reserves

The average annual net growth increment of Finnish forests before the war was about 42,000,000 cubic meters (solid measure), of which about 44 per cent was pine, about 28 per cent spruce, and 23 per cent birch. Because of the volume of sulphite and mechanical-pulp capacity, annual cutting of spruce slightly exceeded regrowth. For pine, annual cut and growth were about equal, whereas for birch less than two-thirds of the annual increment was cut. The average quantity felled for all purposes was variously estimated as from 37,000,000 to 39,000,000 cubic meters (solid measure excluding bark), and of this supply industries consumed nearly 45 per cent as materials and 3 per cent as fuel. The demand for pulp was constantly growing (although saw-mill refuse was much used by Finnish pulp mills, not only as fuel, but as raw material). Thus the average annual pulpwood consumption of the period 1927-36 was about 4,800,000 cu. m. (solid), or perhaps more than 6,000,000 cu. m. corded measure, and this had risen to well over 11,000,000 cu. m. (corded measure) in 1937.

Although full details concerning the forest reserves and pulp supply now remaining in Finland's possession are not available, some general facts concerning the situation are known. Because of shortage of labor and transportation, felling during the war was intensive in areas near railways and navigable water, but less intensive in the more inaccessible areas. This resulted in a potential reserve of uncut growth in the less accessible areas, although fuel-wood consumption was heavy (16,800,000 cu. m. in 1943-44, against an annual average of 6,500,000 cu. m. in 1936-38—all in corded measure). The accumulated reserve, which can be drawn on in the present emergency, has been privately estimated as high as 60,000,000 cu. m. (corded measure). The annual growth increment of the forests remaining to Finland has been similarly estimated at about 39,000,000 cu. m. solid measure). The felling program for the fuel year beginning in July 1945 amounts to a record quantity of 52,000,000 cu. m. (corded measure), of which 54 per cent is fuel wood, 25 per cent is sawlags, and 21 per cent small rounds (pulpwood, pit props, and other). This over-all program is said to have been 40.2 per cent complete by the end of November 1945, in that 20,900,000 cu. m. had been felled. The problem of transportation remained to be solved, however.

Pulpwood Supply

The current felling year's program calls for 8,300,000 cu. m. (corded measure) of pulpwood. On October 1, 1945, stocks at the mills were only 3,500,000 cu. m. (compared with a usual stock, in prewar years, of more than 1 year's consumption of the mills). An additional 2,100,000 cu. m. were ready for transportation, and 3,300,000 cu. m. were felled, but still in the forests. Truck transport was in bad repair, however, and the railways were overburdened (fuel wood requires about three times as much car capacity for transportation as does its coal equivalent).

The original 1944 armistice agreement required that Finland deliver 910,000 cu. m. of pulpwood to the Soviet Union during a 6-year period; deliveries for 1944-45 being 155,000 cu. m. The delivery period has now been lengthened to 8 years, thus reducing annual deliveries. However, additional deliveries of forest products to the Soviet Union in 1946, under the classification of "restitutions," constitute a heavy burden on Finnish wood supplies.

Coal deliveries to the mills have obviously been inadequate, even for the present reduced rate of operation, and some pulpwood may have been used as fuel, inasmuch as the 1944-45 felling year produced only 75 per cent of the scheduled quantities. Moreover, during the war years felling was largely confined to the more accessible areas, and it is now necessary to utilize those less easily reached.

In 1944, about 11,900,000 cu. m. of logs were floated to their destination and 6,000,000 cu. m. were transported by road. Finland had about 20,000 motor trucks in 1939, and about half are believed to remain, but many are in bad repair and there is an acute shortage of tires. Floating of timber takes place in the late spring and early summer in Finland, and, under normal conditions, pulpwood requires several months' storage before use. In consequence, the maintenance of pulpwood supplies at the mills makes it imperative that Finland provide additional motor transport. Finnish press sources state that the United Kingdom has agreed to supply from 600 to 800 motor trucks, as well as parts for the assembly of 2,500 more, with deliveries to commence in March 1946. The recent $35,000,000 United States-Finnish loan agreement, and the contemplated $10,000,000 credit for purchases from United States Army stocks in Europe should prove of great benefit to Finnish transportation.

Fuel Supply

Finland has no coal deposits. The peat deposits, although extensive, are difficult to utilize. (A special law for the promotion of peat production recently has been passed.) Consequently, Finland has used wood extensively as fuel and even many

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The *CAMBRIDGE* is made in a hand model and with an extension to reach those hard-to-get-at places.

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SURFACE PYROMETERS

TIN LIZZIE IS NO PUDDLE JUMPER

Yes sir, she is the oldest machine in the mill, a regular T Model. The boys used to call her a puddle jumper because the wet felts ran off her like the fan belt of a flivver. But since we equipped her with a Hamilton Felt she runs top speed and true as a die, with never a break in the sheet from couch to slitters.

Equip your least efficient paper machine with a Hamilton Felt and get results. Save a lot of steam at the driers, too. And your finished product will have much better formation.

• From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lower cost.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

• Miami Woolen Mills •

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• Established 1858 •

railway lines have always burned wood, though imports of coal and coke were increasing prior to the war, and the hydroelectric resources of the country were being developed constantly

For the years 1936-38 fuel-wood consumption amounted to 6,600,000 cu. m. (corded measure), in addition to a 5,000,000 cu. m. equivalent quantity of industrial waste wood, and the like. In 1937 coal and coke imports amounted to 2,230,000 metric tons, or the equivalent of 13,500,000 cu. m. of wood. During the war, with diminished fossil-fuel imports, annual fuel-wood consumption was between 16,000,000 and 17,000,000 cu. m. With extremely inadequate coal imports (and reduced forest area), Finland has to cut about 28,000,000 cu. m. of wood for fuel this season, if the current increased demand is to be met. At prewar prices, 1 ton of chemical pulp purchased about 10 tons of coal. With the high sea-freight rates prevailing at present, it is difficult to reach even an approximate comparative figure, but it is evident that the exclusive use of good grades of wood as fuel in the pulp and paper industry must greatly increase costs.

The Finnish pulp industry used considerable electric energy prior to the war, and mills now operating in the southeastern part of the country may be particularly affected by the loss of important hydroelectric plants to the Soviet Union. Before the war, the annual capacity of the hydroelectric plants of the country was about 3,000,000,000 kw.-hr. At present the capacity is about 2,300,000,000 kw.-hr., whereas the total demand is for approximately 3,000,000,000 kw.-hr. However, four major plants, with a combined capacity of 1,000,000,000 kw.-hr. per year are now under construction, and plans for further development of the hydroelectric resources of the country (estimated at about 8,000,000,000 kw.-hr. per year) have been considered. Much imported equipment probably will be required for these developments.

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Looping, Drying and Cooling Systems
Winders for Roll Roofing
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We also manufacture cutting cylinders, anvil rolls, and squeeze rolls. We make a specially constructed steam jacketed 2" and 3" pump for handling viscous materials such as filled asphalt, heavy lubricating oils, and kindred products.

Pump catalogue upon request.

Other Requirements

Although Finland furnished nearly all the materials for its pulp and paper industries, imports—which in 1937 amounted, by value, to only 3.7 per cent of all materials used in the mechanical-pulp mills, 10.2 per cent of the total for sulphite mills, 11.3 per cent for sulphate mills, and 8.0 per cent for paper—were none the less essential to efficient operation. Because of wear and tear and depletion of stocks during the war, the industries' present need for imports is particularly acute.

Domestic pyrite is an adequate source of sulphur for the pulp industry of Finland, and the limestone required by it also is available domestically, but lime production is handicapped by the coal shortage. The pulp industry used about 15,000 tons of salt in electrolysis in 1937, and, if salt can be obtained from the Soviet Union, as scheduled, domestic chlorine and sodium hydroxide should meet the industry's needs. Salt-cake requirements are about 50,000 tons and are expected to be filled by the United Kingdom and the Soviet Union. Requirements of casein (1,100 metric tons), tires and tubes (3,500 of each), and machine knives probably will have to be obtained from the United States, if they are to be had at all.

Other 1946 imports considered indispensable by the Finnish wood-products industries (and for which the United States is expected to be one of the sources) are, with quantities in metric tons in parentheses, as follows: Albumen (1,100), aluminum sulphate (4,000), aniline dyes (58), balata and rubber belting (40), china clay (9,975), graphite electrodes (35), grinding wheels (20), iron and steel hoop (2,365), bale wire (4,175), machine felts (150), packings (43), phosphor bronze wire (100), ready-made machine wire cloths (55), rosin (2,473), salt cake (50,000), acid-resistant, shaft, and tool steels (471), wool for machine felts (103), inhaust tubes (426).

Coal remains the basic problem of the industry, and estimates place its minimum 1946 requirement at 400,000 metric tons (or the equivalent of about 6,700,000 cu. m. (corded) of wood, which, in the final analysis, represents nearly 1,000,000 tons of chemical pulp.

Export Program

A comparison of planned 1945 commercial exports of Finnish forest products with approximate 1938 exports illustrates the foreign-trade problem Finland has faced. Thus, in 1945 only 200,000 metric tons of chemical pulp could be expected to be exported (aside from "armistice" deliveries to the Soviet Union), contrasted with exports of approximately 1,000,000 tons in 1938. For mechanical pulp and board the situation was somewhat better—1945 planned exports amounted to 17,000 tons, as compared with 300,000 tons in 1938. Exports of paper in 1945 were set at 120,000 tons (1938 exports, 460,000 tons), those of lumber, including prefabricated houses, at 220,000 standards (1938, 850,000 standards) and those of plywood at 62,000 cu. m. (1938, 200,000 cu. m.). Because of various adverse factors—weather unfavorable to forestry, the lack of materials and fuel in industry, and the shortage of clothing for foresters—even this schedule could not be fulfilled in 1945.

The 1946 commercial export program for all forest products is expected to give better results than that of 1945, except for lumber and plywood. It is anticipated that chemical-pulp production will amount to 500,000 metric tons, with 200,000 tons available for exports other than those required under the armistice. For mechanical pulp and board, it is hoped to export commercially approximately 190,000 tons, out of a total production of 485,000 tons; and for paper, exports of 137,000 tons, out of a production of 280,000 tons, are anticipated.

Because of heavy domestic demand for housing, to provide for evacuated Karelians and the "restitution" deliveries required by Russia in 1946 (in addition to "reparation" deliveries), it is expected that only 110,000 standards of lumber (including prefabricated houses) can be "commercially" exported in 1946, out of a total production of 600,000 standards. And for similar reasons, a production of 150,000 cubic meters of plywood is expected to provide only 55,000 cubic meters for commercial exports. As a consequence, it has been estimated that total Finnish commercial exports will not exceed $60,000,000 in 1946, although the indispensable import requirements are far larger. It is evident, therefore, that commercial pulp and paper exports are of prime importance to Finland at present.

According to private sources in Finland, stocks of chemical pulp were as follows on September 30, 1945, in metric tons: Bleached sulphite, dissolving grades, 2,666; bleached sulphite, paper grades, 7,931; unbleached sulphite, paper grades, 10,070; and unbleached sulphate, 28,258, or a total of 48,925 tons. Mechanical-pulp stocks, on a dry-weight basis amounted to only 20,664 tons of wet and 2,883 tons of dry pulp on November 1, 1945.

Export figures for the last quarter of 1945 are not yet available, but during the third quarter those of mechanical pulp amounted to 32,000 tons and those of chemical pulp, to 81,000 tons. It is obvious that stocks remain low, and exports must come from current production.

In order to obtain food and other indispensable supplies, Finland has concluded agreements with several countries for the mutual exchange of commodities. The important deliveries from Sweden are obtained on credit, to a very considerable extent, and it is estimated that Finland has obtained credit amounting to some 600,000,000 Swedish crown ($144,000,000) in recent years. However, in

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Fig. 3003—Class 300-pound Cast Steel Gate Valve. Has flanged ends, outside screw rising stem, bolted flanged yoke and taper wedge solid disc.

Fig. 1793—Iron Body Bronze Mounted Gate Valve for 125 pounds W.S.P. Has flanged ends, outside screw rising stem, bolted flanged yoke, bronze seat rings and taper wedge solid disc. Also available in All Iron for process lines.

Fig. 1503—Class 150-pound Cast Steel Gate Valve. Has flanged ends, outside screw rising stem, bolted flanged yoke and taper wedge solid disc.

Fig. 1460—Iron Body Bronze Mounted "Master Pilot" Gate Valve with screwed ends, rising stem, bolted flanged bonnet and taper wedge solid disc. Also available in All Iron for process lines.

FOR 100 YEARS, Powell has concentrated on making valves—and valves only—to meet every demand imposed by the amazing progress of American industry. That is why today Powell has the correct valve for every known service in the modern paper mill.

Bronze and Iron Body Bronze Mounted Valves of all types offer the widest possible selection for handling intermediate pressures. The latter are also available in All Iron for process lines. Cast Steel Valves of all types and sizes are available in pressure classes from 150 to 2500 pounds. A complete line of Corrosion-Resistant Valves for process lines is another feature of the Powell Line of Valves for the Paper Industry. Catalogs and details on request.

The Wm. Powell Company, Cincinnati 22, Ohio

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POWELL VALVES

other cases (except for the credits obtained from the United States and Brazil) Finland has had to deliver merchandise, principally forest products, in order to obtain the needed imports, and in some instances Finnish exports have had to be made considerably in advance of the compensating imports. Such agreements have already been concluded with the United Kingdom, Denmark, Norway, Iceland, Belgium, France, and the Soviet Union.

The period for reparation deliveries to Russia under the 1944 armistice has been extended from 6 to 8 years, thus reducing annual deliveries on this account, but very considerable deliveries of forest products to the Soviet Union during 1946 are also scheduled, as "restitution" deliveries.

Finnish pulp exporters hope to ship 75,000 metric tons of chemical pulp, with a total value of $6,000,000, to the United States during the period December 1945 to June, 1946, and there are possibilities of delivering 15,000 metric tons of mechanical pulp during 1946.

Price conditions and other factors make prospects for deliveries of newsprint more or less remote, and the outlook for shipments of kraft paper and container board also are uncertain, at least for early 1946.

Convention Papers . . . Abridged

Current Problems of the Public Printer

A. E. GIEGENGACK
Public Printer of the United States

Before the war and in the early stages of the war, the purchasing of paper was one of the least of the Government Printing Office's problems. We were a preferred customer. Everybody wanted the business. When demand for pulp and paper began to enlarge and requirements of the Government Printing Office to skyrocket, we found attitudes changing.

Less than two years after our entry into the war, mills and dealers were losing interest in bidding at Government Printing Office openings. The situation became so bad that in September, 1943, I went before the Army and Navy Requirements Conference, sponsored by the Technical Association of the Pulp and Paper Industry and held at the Palmer House in Chicago, and appealed for understanding and assistance. I think my story at that time opened the eyes of the paper manufacturers and merchants to the importance of Government printing in the war effort, and for a time we received a greater amount of co-operation. Now, the war being over, Government printing seems to be no longer important. Accepting the theory that the war is over, there is no escaping the fact that the Government still has a lot of critical work to do. Without adequate supplies of paper for prompt delivery of printing, the job cannot be done.

The Government Printing Office operates under the supervision of the Congressional Joint Committee on Printing. By law, it is required to take care of all printing and binding for the Government service, including the military forces, both at home and abroad. It is absolutely imperative that a source of supply for the many grades of paper used in this work be available. Without paper, we cannot print. Without printing, there is the threat of disaster to important programs of the Government.

The heads of the Government departments are in no mood to listen to my excuses when they ask for printing. Just as surely as I stand here, I know they will go to Congress for relief if I tell them their printing must wait on the willingness of the paper industry to supply stock.

On our proposal for nearly 10 million pounds of chemical wood writing paper, bids were received on less than 3 million pounds. Accompanying table shows a partial list of proposals and the bids received.

Now we are being asked why the Government's need for paper continues. Let me tell you as briefly as I can why we want the paper that nobody so far has agreed to furnish:

Our requirements for *newsprint* are principally for daily printing of 42,500 copies of the *Congressional Record* and 20,500 copies of the *Federal Register*.

Catalogue news is used for listing of all War Department material and parts. These catalogues are recognized as among the most important publications printed by the Government, and are as important to Army supply officers as the mail-order catalogue is to the backwoods farmer. Remember that there are still several million men in the service to be equipped and supplied. Incidentally, I am glad to report that some of the heat is off our newsprint requirements. We have succeeded by special effort and arrangement to cover our needs for a few months.

Machine-finish book is used on miscellaneous publications required in large quantities, including catalogues. Probably its most important use is for various types of congressional printing, such as hearings, bills, reports, resolutions, and budgets.

Offset paper is needed for many miscellaneous publications. A cumulative Signal Corps listing of equipment is one of the many publications for which we are trying to get offset stock. We have just printed by offset 90,000 Army field manuals of 80 pages each on a 5-day schedule. Surplus property listings, important both to the Government and to business firms which hope to acquire Government property, are produced by offset. Publications which are needed on short schedules are printed by offset whenever there is no time for composition or it is desired to reproduce the job directly from the typewritten manuscript.

A stable inventory of this stock must be available at all times. We were able to make awards on only one-fourth of our requirements.

Supercalendered book and *dull coated book* may be considered slightly less critical than some of the other on our list,

Grade of paper	Pounds on proposal	Pounds awarded
Catalog news	200,000	None
English-finish book	600,000	None
End paper	50,000	None
Offset paper	1,000,000	250,000
Supercalendered book	1,000,000	600,000
Dull coated book	50,000	None
Chemical wood mimeograph	1,550,000	650,000
Chemical wood writing	9,780,000	2,880,000
Litho-finish map	562,000	466,000
Chemical wood ledger	1,250,000	270,000
Chemical wood index	300,000	100,000
Coated cover	50,000	None
Wood manila	250,000	None
Kraft	200,000	None
Wood cardboard	90,000	None
Newsboard	100,000	None

Abridgment of paper presented before the 43rd Annual Convention of the National Paper Trade Association held at the Waldorf-Astoria Hotel, New York City, on April 2, 1946.

TENAX
"TENAX FELTS ARE TOUGH"

Every TENAX FELT represents the peak of perfection in quality and performance. They are made by a company engaged exclusively in the manufacture of felts for every pulp and paper requirement.

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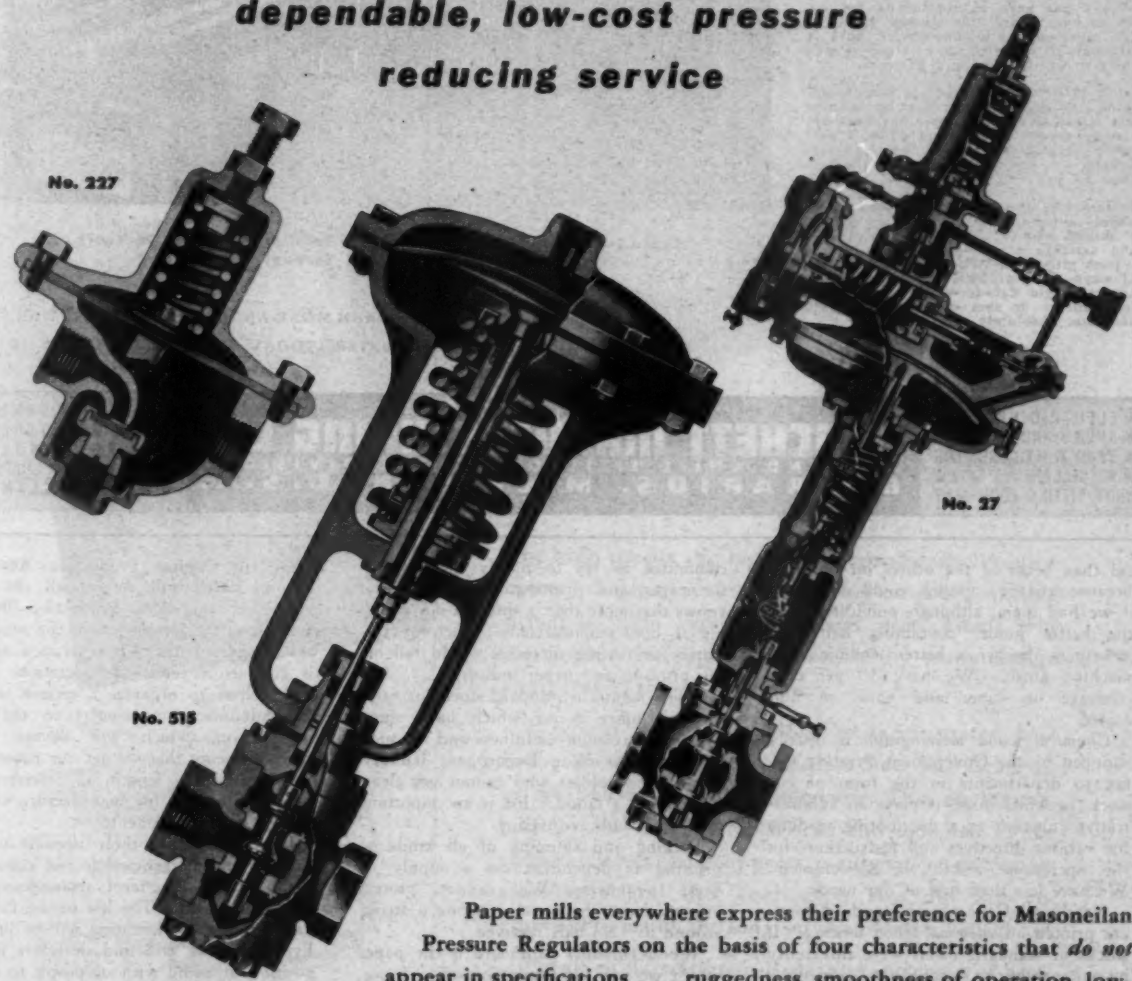
PRESSURE REGULATORS

Speed up paper production with accurate, dependable, low-cost pressure reducing service



Paper mills everywhere express their preference for Masoneilan Pressure Regulators on the basis of four characteristics that *do not* appear in specifications . . . ruggedness, smoothness of operation, low-maintenance and low-operating costs. No matter what your pressure reducing service requirements . . . steam, water or air . . . you too, can save money by installing Masoneilan Regulators. Their accurate operation, ease of adjustment, and long-lived performance will reduce waste and minimize production delays due to time out for servicing . . . Investigate Masoneilan Pressure Regulators. Write for Catalogs 72 and 73, today.

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26 YEARS
OF TROUBLE-FREE OPERATION

That's the combined record of two

HANCHETT AK KNIFE GRINDERS

at Pulp Mill of Rayonier, Inc., Shelton, Wash. W. F. McCann, Master Mechanic at this modern mill, says:

"No. 1 has been in continuous use six to ten hours daily for sixteen years. It has given us excellent service with a minimum of maintenance cost and is still going every day—doing good work.

"In 1936, we purchased the second machine to grind the knives on a new and larger Chipper. It, too, has been operating six or seven hours daily. I certainly would recommend the Hanchett Grinder to anyone having this class of work to do."

Letters like this are not unusual. Completely automatic, the AK doesn't require a skilled operator. Full control of feed and carriage travel—start, stop, reverse—from either side. Force-feed lubrication of ways—fully protected by patented belt covers. Rigid cabinet base for grinding long knives or sets of small blades to accurate, absolutely straight edge.

These Two Machines have a Combined Total of More Than 26 Years of Uninterrupted Service!

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WRITE TODAY FOR BULLETIN 178-11P

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★ KNIFE GRINDERS
★ SWAGES AND SHAPERS
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cal than some of the others on our list, because cheaper grades could be used, if we had them, although publications of the better grade, containing halftones, sometimes deserve a better medium than machine finish. We have 50 per cent coverage on super and none on dull coated.

Chemical wood mimeograph is usually supplied by the Government Printing Office to departments in the form of cut stock, in which form it plays an administrative function as a distributing medium for various directives and instructions for the operations within the Government. We have less than half of our needs.

Nearly all Government standard forms are printed on *chemical wood writing*. If stocks of standard forms were threatened by our inability to supply them, suspension of the Government's paper work would soon prove serious not only to the departments of the Government but also to many business firms throughout the country transacting business with the Government.

It has been suggested that the Government Printing Office use rag bond instead of sulphite bond and sulphite bond instead of writing in order to draw more mills into our available sources of supply. Going from chemical wood to rag would practically double the cost of paper and add substantially to printing charges. During the war, we went to chemical wood for the express purpose of reducing our printing costs. It happens that I have just been before a congressional appropriation committee to try to justify the charges for paper and printing. The Congress knows that more than a third of our printing is done commercially. Much of the blame for further increases would fall on the printing and paper industries.

Wood manila is standard stock for various post-office forms which have short lives but maximum usefulness and for such other jobs as War Department laundry lists. To a soldier who cannot get clean underwear, a laundry list is an important item. No bids received.

Packing and shipping of all kinds of printing is dependent on a supply of *kraft wrappers*. We cannot protect printed matter by merely putting a string around it. No bids received.

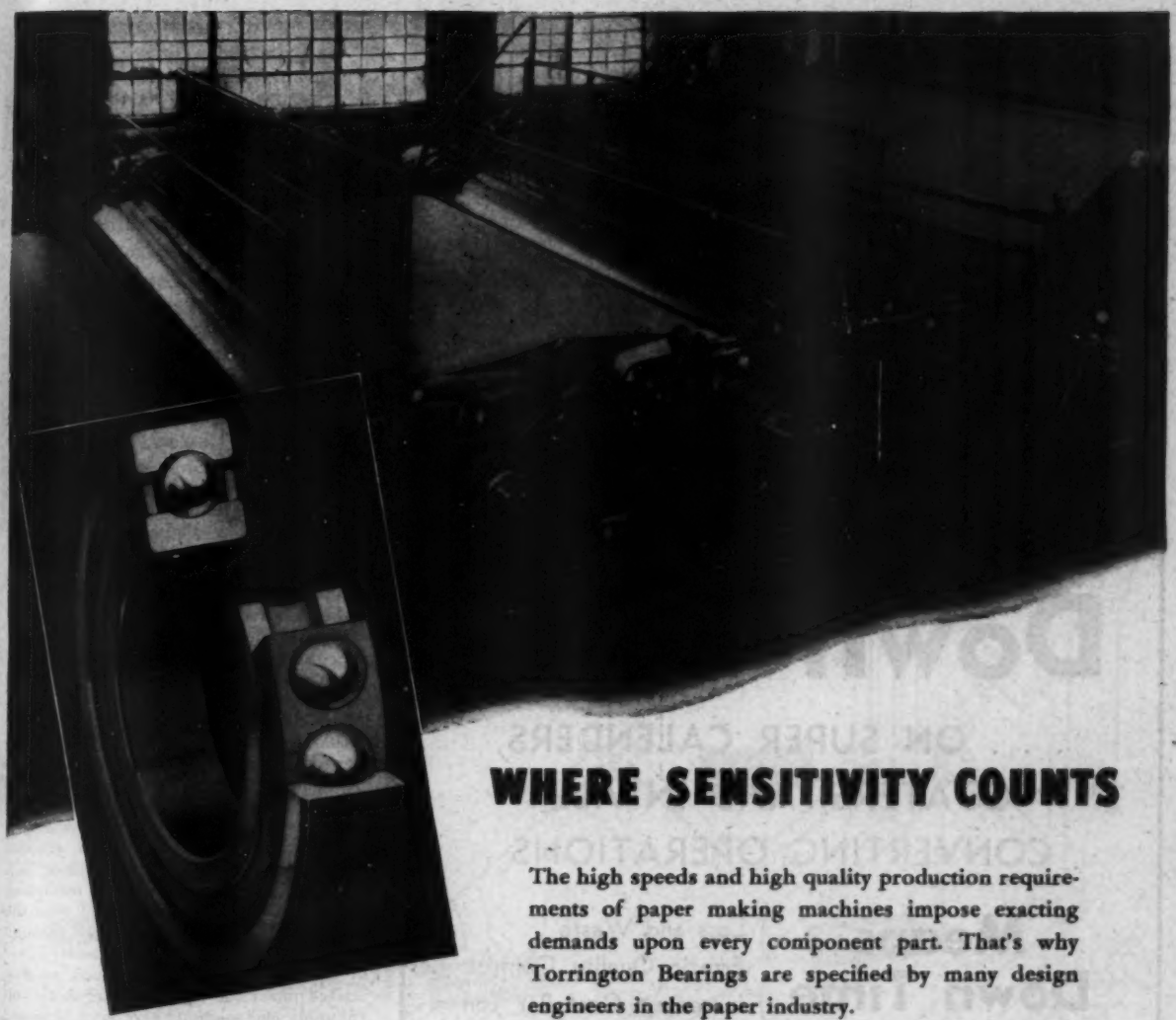
Wood (bristol) cardboard is the paper which we use for many post-office forms, such as change of address and various other important notices. No bid received.

Newsboard uses hardly require explanation. Newsboard goes into various binding and padding operations. Unless we can keep a reasonable inventory of it on hand, the usefulness of much of our printed material will be reduced. No bids received.

With Government functions of such importance at stake, I would be derelict in my duty if I failed to follow every avenue that may lead to the desired results. So, frankly, I am not relying solely on your good intentions. I cannot wait until everybody makes up his mind. The Government Printing Office needs paper now. What could I do? I'll tell you. I went before the Civilian Production Administration, which still retains all the war powers of the War Production Board. As soon as the seriousness of the situation was recognized, the Administration agreed to give us its entire co-operation. We have helped to organize a section within the Administration, similar to the war organization, which will devote itself solely to seeing that we get our paper, going even to the length, if necessary, of issuing directives for manufacture of paper for the Government.

I recognize that these appeals to the industry in emergencies do not constitute a satisfactory long-term arrangement for the Government. The life of the Civilian Production Administration will be limited. Eventually, we will find ourselves in the position of being without power to direct that the Government be furnished the needed paper. Eventually, also, the Government's needs will become routine, and the emergency argument will lose its force. It is possible that when that time comes, commercial accounts may, for whatever reason, still be more attractive than Government business. So what then?

Well, the Government Printing Office has been considering whether it should follow the example of other publishers and acquire its own mills, thus relieving the industry of the necessity of supplying the Government's admittedly uncertain and variable volume. If we should build up such an assured source of supply, the burden on the industry would be greatly reduced and we would need to come to you

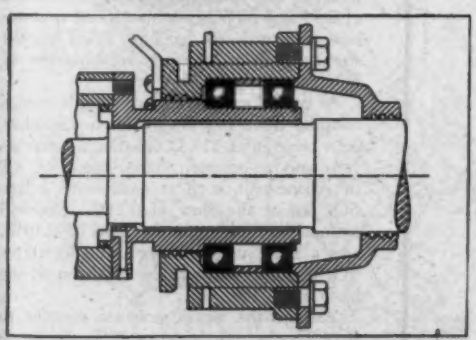


WHERE SENSITIVITY COUNTS

The high speeds and high quality production requirements of paper making machines impose exacting demands upon every component part. That's why Torrington Bearings are specified by many design engineers in the paper industry.

A typical precision application is illustrated here in the use of Torrington Stainless Steel Ball Bearings in the Beloit Air Guide Regulator. This equipment, built by the Beloit Iron Works and installed in the vertical felt run of a dual press, is rugged, yet extremely sensitive . . . and the Torrington Bearings are engineered to match the long service life of the machine.

Think of Torrington Bearings in terms of your own friction problems. Torrington's Bantam Bearings Division is prepared to show you how they can meet your requirements, routine or unusual . . . and effect cost savings all along the line. Your inquiry is invited.



X-Section drawing shows the use of Torrington Stainless Steel Ball Bearings in the Beloit Air Guide Regulator. These bearings are matched in pairs and have retainers of Micarta.

THE TORRINGTON COMPANY • BANTAM BEARINGS DIVISION
SOUTH BEND 21, INDIANA

TORRINGTON BEARINGS

SPHERICAL ROLLER • STRAIGHT ROLLER • TAPERED ROLLER • NEEDLE • BALL

only for specialties. I am not at all sure that this is the right answer.

You have heard that the Government Printing Office had been selling paper, and the question probably arises in your mind, why the Government Printing Office is selling paper on the one hand while it is at the same time asking the industry to furnish it with large quantities of paper? It is true that the Government Printing Office sold paper in San Francisco, Chicago, and New York. This paper had been purchased for the handling of printing to be done by commercial printers, and in most cases the stock was sold because it could not be economically used on the press equipment in the Government Printing Office. Any paper in the three cities mentioned which we could use was returned to Washington to use in our work.

I urge you, as earnestly as I know how, to consider the problem and to use whatever influence you have with the mills you represent to see that Government needs are met. After all, this condition is not one that will continue forever. The time is probably not so far off when Government business will be sought as eagerly as it ever was. In the meantime, would it not be the part of wisdom to avoid the necessity for measures which might delay a return of the industry to normal operation?

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The Kohler System Company

159 East Chicago Avenue

Chicago 11, Illinois

Abridgments in this section are from papers presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, held in New York City, February 25-28, 1946.

Sulphite Pulps—Handling After the Digester

GEO. H. McGREGOR
Minnesota and Ontario Paper Co.

Probably no phase of sulphite pulp manufacture is more pertinent to the ultimate preparations of an acceptable stock than the equipment and operations involved in washing and cleaning.

Blow Pits

Consider the recovery of free SO_2 gas at the blow. Today there are two principles applied in actual practice to recover SO_2 gas. One is the absorption of the SO_2 gas in water to yield a weak solution of sulphurous acid at 35 to 40 C., with subsequent cooling of this weak sulphurous acid solution, and conveying at system rate of flow and proper temperature to the acid plant as the source of liquid to prepare calcium bisulphite storage acid. The other involves recovery of the SO_2 gas in water at such a temperature that the gas will be volatilized and transferred directly to the Jenssen or milk-of-lime towers. The temperature of the residual water may be maintained such that it may be adapted to initial pulp washing.

It has been demonstrated in practice that about 50 to 75% of the free SO_2 at the blow is recoverable. The remainder is lost with the waste liquor and with the stock due to inability to diffuse through the pulp mass into the blow stack.

In a continuous system, such as described under the first principle, weak sulphurous acid solutions have been obtained of 0.75% free SO_2 concentration, continuous operation and head of liquid on the storage tank minimizing volatilization of SO_2 gas.

As typical examples of sulphur recovery, consider three 150 ton unbleached sulphite mills cooking at 137 C. maximum temperature and a common liquor ratio of 4.5 to 1; one mill, such as news, with a free SO_2 test at the blow of 0.25%; one mill with a free SO_2 test at the blow of 0.50%; and a mill, such as those using high free SO_2 test acid, with a free SO_2 test at the blow of 0.75%.

Assume the wood moisture content to be 40%, the pulp yield as 46%, the digesters direct steamed at 5000 pounds of steam per ton of pulp, and 1650 gallons of cooking acid per ton of pulp.

At 50% recovery of the free SO_2 at the blow, calculations show that Mill No. 1 with 0.25% free at the blow can recover 14.9 pounds of sulphur per ton of pulp. At 300 operating days per year and at a value of $25 per ton, the sulphur savings per year would be $7,500. The retirement, maintenance, and operating costs of necessary equipment would be nominal. Mill No. I would approximate a net saving of $5,000 per year.

In like manner, mill No. II with 0.50%

Everything in Piping for Pulp and Paper Machines

ONE

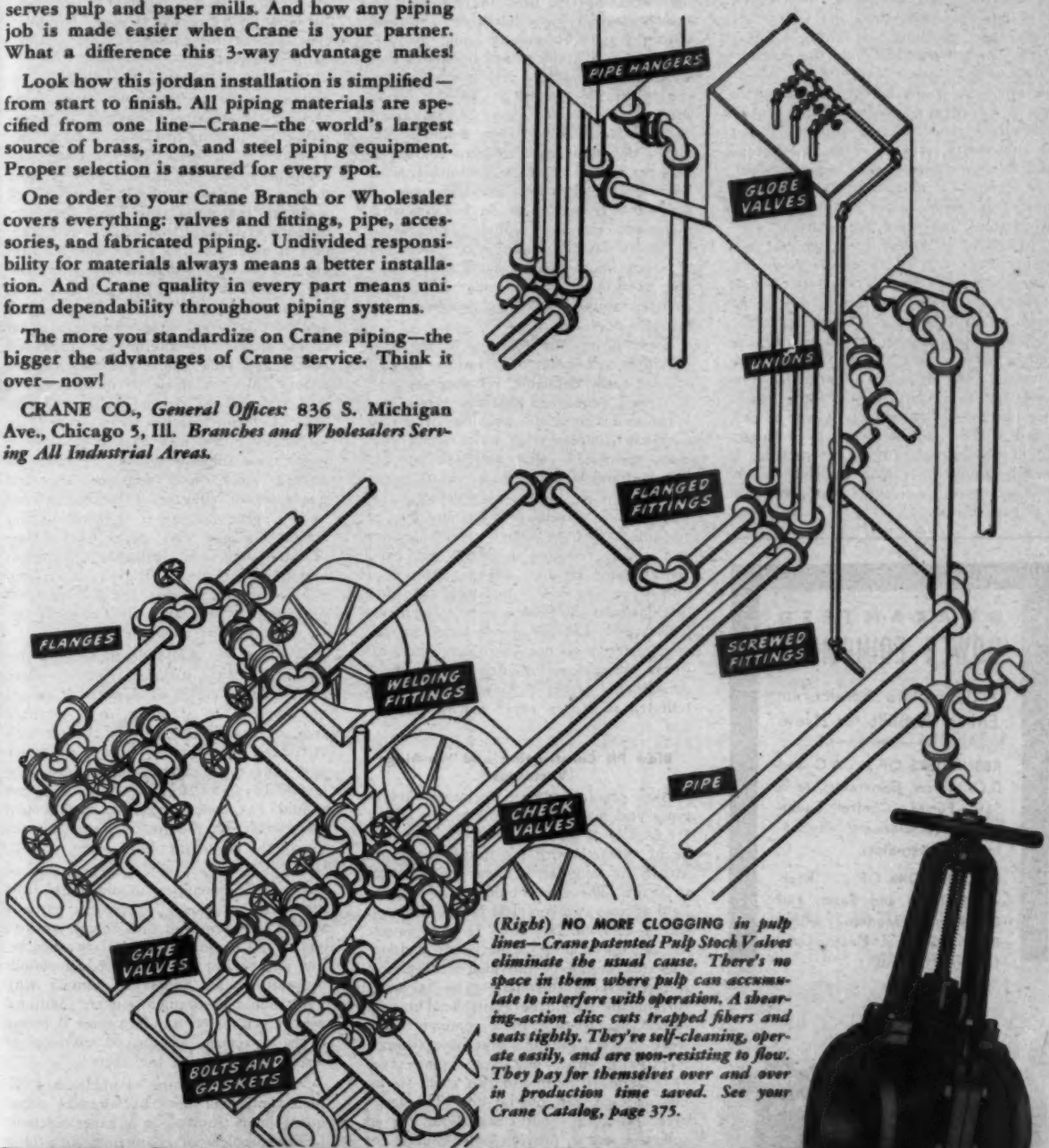
Here's an example of how *completely* the Crane line serves pulp and paper mills. And how any piping job is made easier when Crane is your partner. What a difference this 3-way advantage makes!

Look how this jordan installation is simplified—from start to finish. All piping materials are specified from one line—Crane—the world's largest source of brass, iron, and steel piping equipment. Proper selection is assured for every spot.

One order to your Crane Branch or Wholesaler covers everything: valves and fittings, pipe, accessories, and fabricated piping. Undivided responsibility for materials always means a better installation. And Crane quality in every part means uniform dependability throughout piping systems.

The more you standardize on Crane piping—the bigger the advantages of Crane service. Think it over—now!

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Ill. *Branches and Wholesalers Serving All Industrial Areas.*



(*Right*) **NO MORE CLOGGING** *in pulp lines—Crane patented Pulp Stock Valves eliminate the usual cause. There's no space in them where pulp can accumulate to interfere with operation. A shearing-action disc cuts trapped fibers and seats tightly. They're self-cleaning, operate easily, and are non-resisting to flow. They pay for themselves over and over in production time saved. See your Crane Catalog, page 375.*

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VALVES • FITTINGS
PIPE • PLUMBING
HEATING • PUMPS

CRANE

FOR EVERY PIPING SYSTEM

free at the blow would recover 29.8 pounds of sulphur per ton and under the same conditions as I, the sulphur saving per year would be $15,000.

On the same basis, the sulphur savings for Mill III would be 44.7 pounds per ton of pulp valued at $22,500 per year.

The capital expenditure involved in recovery of the sulphur, of course, depends on the local physical setup. Where the blow pits are arranged in line with a gas and vapor breeching and a single vomit stack, as exists in a few mills, the expenditure would be least. In the case of principle one; e.i., absorption of the gas, there would be required water storage, weak sulphurous acid storage, suitable sprays in the vomit stack, a weak sulphurous acid solution cooler, pumps, piping, valves, and fittings. Greatest success would be derived from use of water from a deep well at constant, fairly low temperature.

Materials of construction would have to be resistant to effects of the gases and solution. It has been demonstrated that stainless steel type 316 metal, or KasSMo is quite adaptable to sulphite practice.

Where the blow pits are staggered, the piping arrangement may be a little more involved. In the case of principle two involving the volatilization of the gas, a hot sulphurous acid storage would be provided or even stainless steel heat exchanger could be utilized. In either instance, it will be found on calculation that usually the savings will warrant a reasonable capital expenditure.

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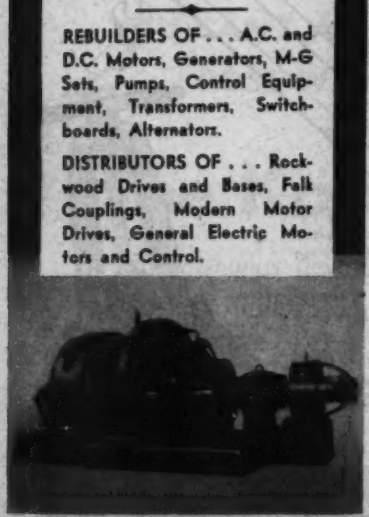

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Next consider the recovery of heat released at the blow from the 150 ton mill mentioned above and under the same conditions of operation. This will be considered as the heat released at the blow, in cooling the contents in the blow pit at the blow from 137 to 100 C., or from 278 to 212 Fahr. For calculation assume a blowing period of 10 minutes and 12-ton digesters, a specific heat for pulp of 0.33, specific heat of waste liquor or 0.95, and specific gravity of cooking liquor of 1.04.

Upon calculation it will be found that the total heat available per blow is equivalent to 18,538,900 B.t.u. With cooling water in winter of 60 Fahr., 24,710 gallons of warm water at 150 Fahr. would be obtained per blow, equivalent to 2,059 gallons per ton at 150 Fahr. In summer with warmer cooling water, the gallonage of hot water recovered would be somewhat increased. This heat could be recovered by direct contact heating, by installation of sprays in the vomit stack, or by indirect heating of water using a heat exchanger, suitable auxiliary equipment being also provided.

Expenditures for recovery of the heat should be reasonable. The returns derived are not easily definable, yet they are real. It is well established that hot water provides more complete washing of pulps; complete elimination of waste liquor residues minimizes color reversion of unbleached and bleached stocks; waste liquor residues left in sulphite pulp definitely interfere with screening operations due to foaming, cutting down screen capacity and usually resulting in dirtier pulp, and waste liquor residues left in unbleached pulps consume very abnormal quantities of chlorine if the pulp is to be subsequently bleached. The use of hot water, as well as a material volume of cooler water, assits in the removal of pitchy and resinous constituents of the pulp which would be reflected in better paper machine operation.

Blow Pit Construction and Washing Variables

Blow pits for sulphite operation vary in types and materials of construction. They are usually of wood construction, but may be of concrete with tile lining. They are usually rectangular, circular or elliptical in shape. The size should be such as to hold at least two complete blows. Blow pit bottom area will vary from 55 to 65 square feet per ton of pulp. A maximum of drainage area should be provided and suitable water showers and high pressure water for sluicing should be available. The vent system may consist of a common vomit stack for each pit, or a breeching arrangement with either one large vomit stack at one end of the line or two vomit stacks, one at each end of the line. The latter breeching and vomit stack should be of sufficient size to provide suitable draft for removal of gases and vapors. There are commercial installations which have been designed to eliminate the necessity of dampers.

Modern drainage systems consist of perforated stainless steel plate, which has proven to be economical and efficient. Sizes of holes, and spacing in perforated plate, should be sufficient to provide ample drainage. The gage of the plate combined with suitable supporting structure should be of sufficient strength to support the head of stock and liquor to which exposed, without buckling or tearing lag screws loose. Free drainage toward the outlet should be provided under the plates to minimize stagnant liquor pools. A convenient perforation for blow pit plates is 3/32 inch at ½ inch centers. A suitable size metal for blow pit bottoms is 16 gage. The usual type 316 stainless steel is well adapted to this duty.

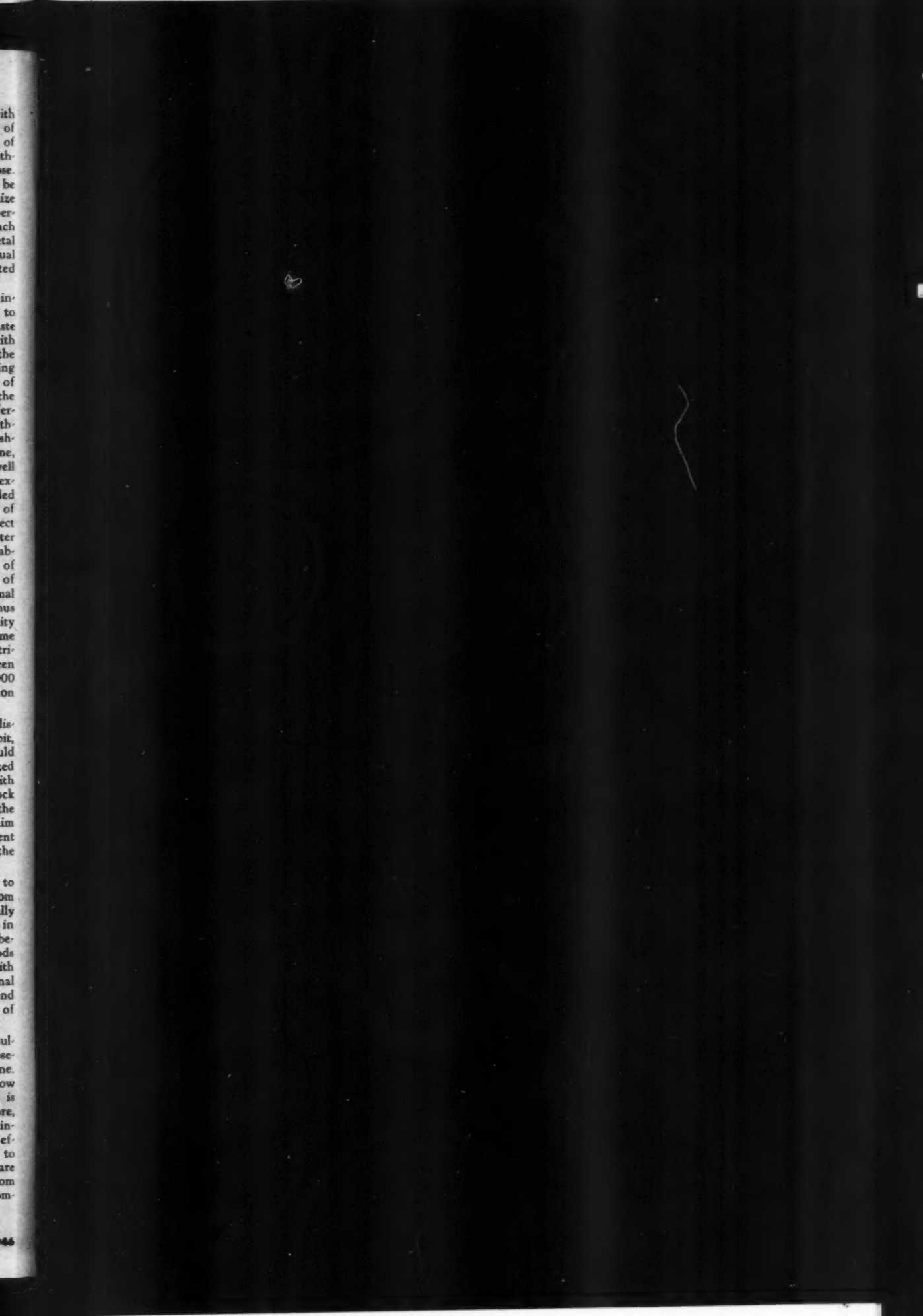
Washing of stock in the blow pit involves the most efficient use of water to remove the maximum amount of waste liquor residues in the time allotted, with a minimum of stock losses through the drainage system. Attendant with blowing pulp is the question of use or non-use of water in the pit at the blow. It is the author's experience that little or no difference is noted in stock losses with or without the use of a bed of water. The washing of stock is affected by quality, volume, and distribution of the water. It is well known that wood pulp provides an excellent medium for filtering out suspended matter and some coloring constituents of water. Thus the efficiency in this respect is directly related to the quality of water used. Coloring matters from water, absorbed by pulps, may change the tint of pulp, cause subsequent color reversion of washed stock, and consume abnormal quantities of chlorine if bleached. Thus money spent on preparing good quality water is money well spent. The volume of water used is also related to the distribution of that water. Reports have been published indicating a usage of from 4,000 to 12,000 gallons of wash water per ton of pulp used in blow pit washing.

Wash water should be thoroughly distributed over the surface of pulp in a pit, preferably by means of showers. It should not impinge in a stream in a localized area, or against the sides of the pit with attendant possibility of boring the stock and thus cause channeling or even the possibility of floating the stock. The aim should be toward positive displacement downward over the greatest area from the top of the pit to the drain plates.

Only in cases of emergency due to mechanical difficulties should pulp from digesters be blown on stock partially washed. At periods of shut downs, stock in pits should be quite thoroughly washed before an operator leaves the job. At periods of start-up, all liquids in contact with pulp should be drained and an additional wash given, as on standing there is bound to be a certain amount of diffusion of waste residues from the fibers.

A thorough washing of unbleached sulphite pulp will tend to minimize subsequent pitch troubles on a paper machine.

The problem of channeling in a blow pit and diffuser type washing system is well known in the industry. Therefore, an auxiliary vacuum type filter washer installed after the blow pits is a very efficient, economical piece of equipment to install. Localized unwashed areas are broken up upon removal of stock from the pit and any residual waste liquor completely removed.



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An 8 foot diameter by 12 foot face vacuum filter with barometric water leg is sufficient to adequately handle from 100 to 150 tons of pulp per day. This should be installed between the blow pits and the knotter screens or blending chest.

A *p*H test of white water accompanying stock from a blow pit or off an auxiliary washer, will serve as a suitable control test for washing efficiency.

Most mills sluice out stock from pits with a high pressure hose. A few mills have provided the pits with sluicing nozzles, arranged around at least half the pit just above the drainage plates, and by means of high pressure water enable removing the stock efficiently in a very short period of time and at the maximum consistency the pump will take.

Time saved in sluicing can be used as additional washing time; ⅜- or ½-inch nozzles, connected to a suitable header, will suffice for this work in the average pit. With a water pressure of 65 to 75 pounds gage on the header, stock can be removed from a pit in one-fourth the time necessary for ordinary sluicing. Stock losses from pits equipped with perforated plate drainage bottoms is quite nominal, usually about 35 to 50 pounds per blow, such that the cost of recovering is hardly warranted.

Use of Vacuum Type Filter Washer

Recent advances in sulphite pulp washing as well as kraft pulp washing entails the use of the vacuum type filter washer. This practice is especially related to the recovery of waste sulphite liquor for other uses. Waste liquor as removed from the digester at best contains 10 to 12% solids. Thus excessive use of wash water in the pits or on a washer would result in waste liquor low in solids, entailing excessive evaporation costs if such procedure is contemplated. Approximately 50% of strong waste liquor can be obtained as a result of free drainage in a blow pit. Efficient kraft washing on a vacuum type filter washer would entail the use of 2.0 to 2.5 pounds of wash water per pound of pulp. Similar practice should result from sulphite washing on a vacuum washer. On the other hand, 10 to 15 pounds of water per pound of pulp are used in blow pit washing of sulphite. Thus very abnormal evaporation costs would result from recovery of concentrated waste liquor from usual sulphite operation. Vacuum washing equipment for sulphite would in all probability have to be of stainless steel construction. Thus a problem for investigation related to recovery of strong waste liquors from sulphite is cooking with the use of greater quantities of waste liquors in the digesters and determination of the effect on pulp quality. Such research should be repeated in the light of modern sulphite practice.

Unbleached Sulphite Blending Chest

It is well known in practice that variations in wood quality, wood moisture content, cooking acid, and cooking technique are such that in normal production pulp from the digesters will vary somewhat in quality. Especially is this so in mills where the digesters are not equipped with circulation systems, where, for instance, the aim is to manufacture a 5% chlorine demand pulp, it would be reasonable to expect the chlorine demand to vary from 4.5 to 5.5% from cook to cook. In mills with digesters not equipped with circulation systems, greater fluctuation might be expected in the chlorine demand of pulp. Such variations are likewise reflected in the physical and chemical qualities of pulp. A blending tank or system, entailing provision for mixing at least the major portion of three cooks, will tend to offset these variations and yield a product of quite uniform quality for subsequent disposition thus simplifying bleaching practice to cook book procedure and permitting greater assurance to the papermaker of uniform quality paper, provided that other handling is carefully controlled.

Knotter Screens

Knots and such materials are removed from considerable tonnage of sulphite pulp by use of centrifugal type screens with perforated plates. A common model of this type screen containing screen plates with ¼-inch holes at ⅜-inch centers will handle 40 to 60 tons of pulp per day at 0.4% consistency. The horsepower, space required, maintenance, and labor are usually quite low for this equipment. One possible disadvantage, especially in the manufacture of pulps for fine papers, is the somewhat excessive agitation, tending to brush apart shives and knots. Such screens should be regularly examined for possible damage to perforated plates. The wastage of fiber with the knots from this type of screen is quite low.

The second type of knotter is the flat knotter screen which finds greater favor in those mills producing pulp for the market. This type of screen may require slightly more space but the horsepower, maintenance, and labor requirements are low. The vat construction and drive may be of one of a number of designs. The screen plates may be of either bronze, chromium plated steel, or chrome nickel steel construction. They are usually provided with a scraper arrangement to remove the knots from tail end of screens. The capacity of the screens is dependent, of course, on stock consistency, screen plate cut size, and the frequency and amplitude of the vibrating mechanism. The usual screen plate cut size will vary from 0.025 to 0.040 inches wide, depending on the extent of cleaning desired in this operation. Production from this type knotter screen will usually vary from 2.5 to 4.0 tons per plate per day.

A recent development in knotter screens involves a flat type screen equipped with magnetic vibrator which has principally been adapted from the mining industry. This type of equipment is receiving favor in the industry as result of high capacity, low power consumption, low maintenance, and clean pulp.

Rejects from knotter screens are treated in various manners, from discarding to blending with tailings from the fine screens, with subsequent refining and use for various types of wrapper or board stock. Careful consideration should be given to knotter rejects before they are discarded. Knots can be readily fiberized in a hammermill type of crusher and when blended and refined together with fine screen tailings, find a use at slight expense, or even at some profit for the mill.

Rifflers and Fine Screens

A considerable tonnage of sulphite pulp is screened merely by the use of the centrifugal type screens equipped with perforated plate. A common model of this type screen with plates containing 0.050-inch holes spaced on ⅛ inch centers will handle 20 to 25 tons of pulp per day.

As a means of cleaning pulp, rifflers have been the subject of much discussion. The one questionable feature is space required for handling reasonable tonnages.

The construction and operating characteristics of rifflers are quite diversified. Rifflers are operated at shallow depth to reasonable depth, from approximately 6 inches to 2 feet. Velocities vary from approximately 0.5 to 4 feet per second. Consistency varies from approximately 0.30% to 1.0%. Unobstructed flow or interrupted flow by baffles are both widely practiced. Riffler floors may be plain wood or concrete, or may be covered by long nap cotton felts, or even used woolen felts from paper or pulp machines. Baffles may be provided for a short section at the head of a riffle. Extent of cleanliness accomplished by riffling largely dictates the conditions of construction and operation.

A rather efficient riffler arrangement for 100 tons of unbleached pulp per day could consist of four rifflers each 8 feet wide and 75 feet long, equivalent to 24 square feet of area per ton of pulp per day. Operation would be carried out at 0.30 to 0.35% consistency, depth of flow 6

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to 8 inches, velocity of flow approximately 1 foot per second. The base of the riffler may or may not be supplied with half round or straight baffles, moderately spaced on long nap cotton or woolen felt. Baffles tend to interfere with washing operations. Such riffers, should be washed at least once every 24 hours.

In general, in sulphite pulp operation, it is the author's opinion that rifflers, if properly designed and operated to best suit local conditions, are an efficient and economical means of assisting in the cleaning of unbleached sulphite pulp. Tests have indicated that for reasonable flow depths, long nap cotton felts are as efficient as baffles in dirt removal. The distance apart materially affects efficiency of baffles. Baffles slanted against the stream are usually more efficient than baffles slanted with the stream.

Probably the greatest tonnage of unbleached sulphite pulp is cleaned by means of flat screens. Efficiency of flat screen cleaning is dependent largely upon pulp consistency, method of approach of pulp slurry to the screen row, cleanliness of screen plates, slot size of screen plates, frequency and amplitude of vibrating mechanism. A wide variety of operating conditions are possible, dependent on the requirements and desires of management, although there are definite limitations of equipment for quality desired and those limitations should not be exceeded unless it is recognized that poorer quality will result.

In the past few years, screen plate materials of construction and type of construction have undergone considerable change. The old bronze plates with the tendency toward slot wear and size change necessitating recutting are being replaced with chromium plated bronze plates and chrome nickel steel plates. Although the first cost is considerably higher the ultimate unit cost is much lower than bronze. As a result of definiteness and stability of slot size, normal production of regular quality is constantly maintained, provided other operating factors are properly supervised. The author would recommend that slot sizes of new and used plates be checked completely with a filar micrometer, a measuring device adapted to the common microscope. Standard thickness gages can be used for cursory checks but for definiteness and accuracy, the filar micrometer is recommended.

Studies should be made for each mill as regards proper frequency and amplitude of the vibrating mechanism, to insure maximum production of quality pulp in a given mill. Likewise, studies should be made of hydraulic flow at the screen vat discharge

Needless to say, screen plates and vats should be regularly and completely cleaned at required intervals. Various chemicals are available for periodic slime cleaning, such as chlorinated phenols, and if a bleach plant is operated in conjunction with the mill, a small dosage of bleach liquor in the white water run over the screens just after shut down or prior to start up is very beneficial. Cleanliness of screen plate slots is very essential to efficient operation and life of plates. For high quality, clean unbleached sulphite pulp, screen plate cut sizes will vary from 0.006 cut on the tailings line to 0.009 to 0.010 cut plates in the primary screens. Under such an arrangement, an average production rate of 0.40 to 0.45 tons per plate per day can be expected. Flat screen operation involves rather low power requirements. For operation of the flat screens themselves, a reasonable power figure would be 0.6 installed horsepower per ton of pulp.

Control

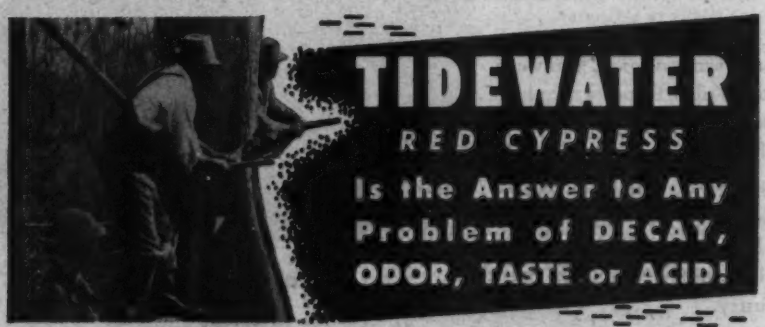
Control of operations in riffling and screening contribute largely to efficiency and miximum production of high quality product. The entire riffling and screen operation is dependent primarily on uniform consistency. Any variation is directly related to a number of other factors which in total directly affect the quality and quantity of pulp cleaned. Photoelectric indicating and control devices have been in operation now for a number of years to accurately control consistence and flow. A submerged type photo cell arrangement, with suitable light source and sensitive element, is operating successfully. A photo cell may actuate a water valve supplying dilution water to stock pumped to knotter screen head boxes, thereby regulating consistence and flow to the rifflers and screens. Such an adaptation is very accurate up to 0.5% consistency and reasonably accurate up to 0.75% consistency. Freedom of flow between the light source and sensitive element must be maintained.

Power Requirements

Power requirements for riffling and flat screening unbleached sulphite pulp are quite reasonable. In the case of centrifugal screens, the power requirement is somewhat higher. A reasonable installed power figure for a system including knotter screens, riffles, flat screen, deckers, and white water pumping, operation in an unbleached sulphite mill would be 2.75 installed horsepower per ton. If blow pit operation is included, the power requirement for washing and cleaning would be approximately 3.00 installed horsepower per ton.

General

In laying out new or modernizing old washing and cleaning departments, adequate capacity should be installed and space provided as necessary. It should be recognized that washing and screen department retirement, maintenance and operation costs represents a small percentage of the cost of pulp production, yet they can affect the final quality all out of proportion to these values. A critical analysis of washing and screening equipment and edequate control of operation may save many times the effort expended and insure a uniform quality product.



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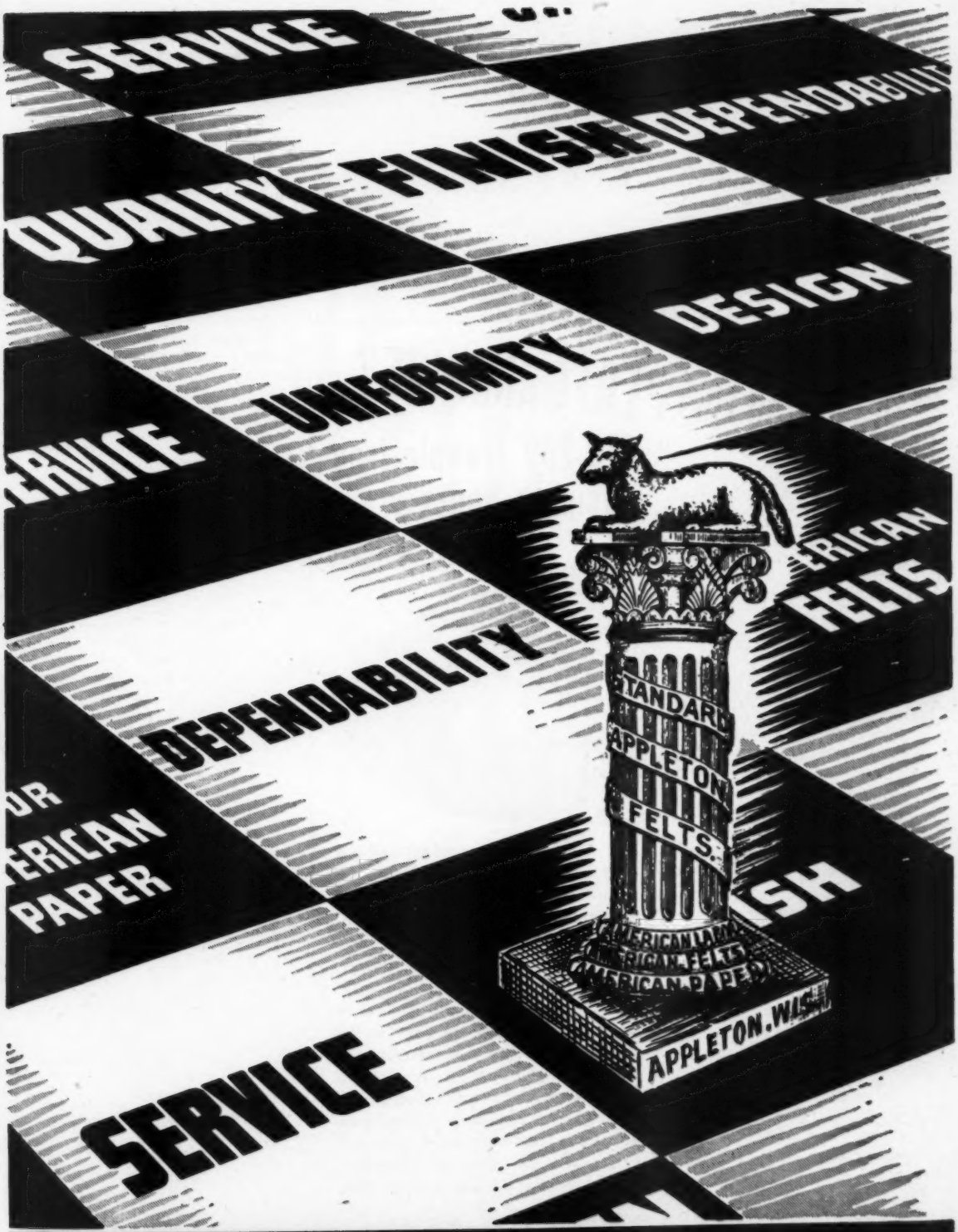
The wood cooked at the present time for the production of easily hydrating pulps is spruce and balsam. It is cooked mostly by the indirect sulphite process in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either horizontal Mitscherlich, or in vertical digesters at low temperatures and extended cooking time. The acid used is generally high in combined SO_2. There are, however, mills that cook this type of pulp with direct steam under otherwise similar conditions.

There are also some special kraft pulps on the market that can be classified as easily hydrating pulps. Tables 1, 2, and 3 give typical beating data of two easily hydrating pulps. One is an indirect sulphite and the other an unbleached kraft pulp. These tables show that the two pulps fulfill the requirements as laid down above for an easily hydrating pulp.

Work with holocellulose has shown that this product develops hydration in remarkably short beating time (Houtz, H. H., and Kurth, E. F., *Tech. Assoc. Papers* 22: 329-332, 1939), and attempts were made to employ pulps rich in hemicellulose for the production of high density papers. This interest was greatly furthered during the war when spruce was hard to get and hardwoods grew right in the back yards of most paper mills.

Poplar wood grows abundantly in the Lake States region is low in lignin content and high in pentosans (Schorger, A. W., *The Chemistry of Cellulose and Wood*, McGraw-Hill, New York, 1926). This species was therefore singled out to find out whether or not a suitable glassine pulp could be made from it.

Commercial cooks of poplar in the authors' mill by the indirect acid sulphite process at 120 C. maximum temperature and a total cooking time of 17 to 18 hours produced pulps that hydrated rather easily but the strength properties were considerably below those of Mitscherlich spruce pulp.

It was then tried to apply acid cooking conditions to a semichemical process using calcium base liquor with a total of 3.25% and a combined SO_2 of 1.5%. The cook was held for 8 hours at 110 C. After refining the resulting chips in an attrition mill, a pulp of fair color was obtained at a yield of 87%. Bleaching with sodium chlorite, chlorine, caustic extraction, and hypochlorite produced a pulp of good strength and fair hydration.

Attention was next directed to the neutral sodium sulphite process as developed by the Forest Products Laboratory at Madison (Curran, C. E., *Tech. Assoc. Papers* 12: 128, 1929) (Bray, M. W., and Eastwood, P. R., *Tech. Assoc. Papers* 13: 92, 1930). Some aspen pulp that was cooked and bleached at Madison by this process was studied in an experimental stone roll beater with results as shown in Table 6. As can be seen, the pulp developed remarkable strength properties and good hydration.

Comparison of the data of Table 6 with that of Table 1 shows that this pulp is well within the strength level of Mitscherlich spruce.

The values of per cent bursting strength and tear were obtained by dividing the burst, Elmendorf tear tests respectively by the basis weight of the test sheet and mul-

Table 1.—Bleached Mitscherlich

Beating Time (minutes)	Bursting Strength (per cent)	Tear (per cent)	Hydration
0	52	258	
20	118	113	
40	128	71	Very high
60	135	64	Very high
80	137	60	Very high
100	134	55	Very high

Table 2.—Unbleached Kraft

Beating Time (minutes)	Bursting Strength (per cent)	Tear (per cent)	Hydration
0	15	296	
20	69	258	
40	110	205	
60	118	159	None
80	125	124	None
100	123	102	High

Table 3.—Same Kraft as of Table 2 but Bleached

Beating Time (minutes)	Bursting Strength (per cent)	Tear (per cent)	Hydration
0	39	368	
20	110	250	
40	125	145	
60	133	104	High
80	133	79	Very high
100	137	68	Very high

Table 6

Beating Time (minutes)	Bursting Strength (per cent)	Tear (per cent)	Hydration
0	99	157	
20	130	136	
40	145	110	
60	147	102	
80	148	84	Very high
100	149	59	Very high

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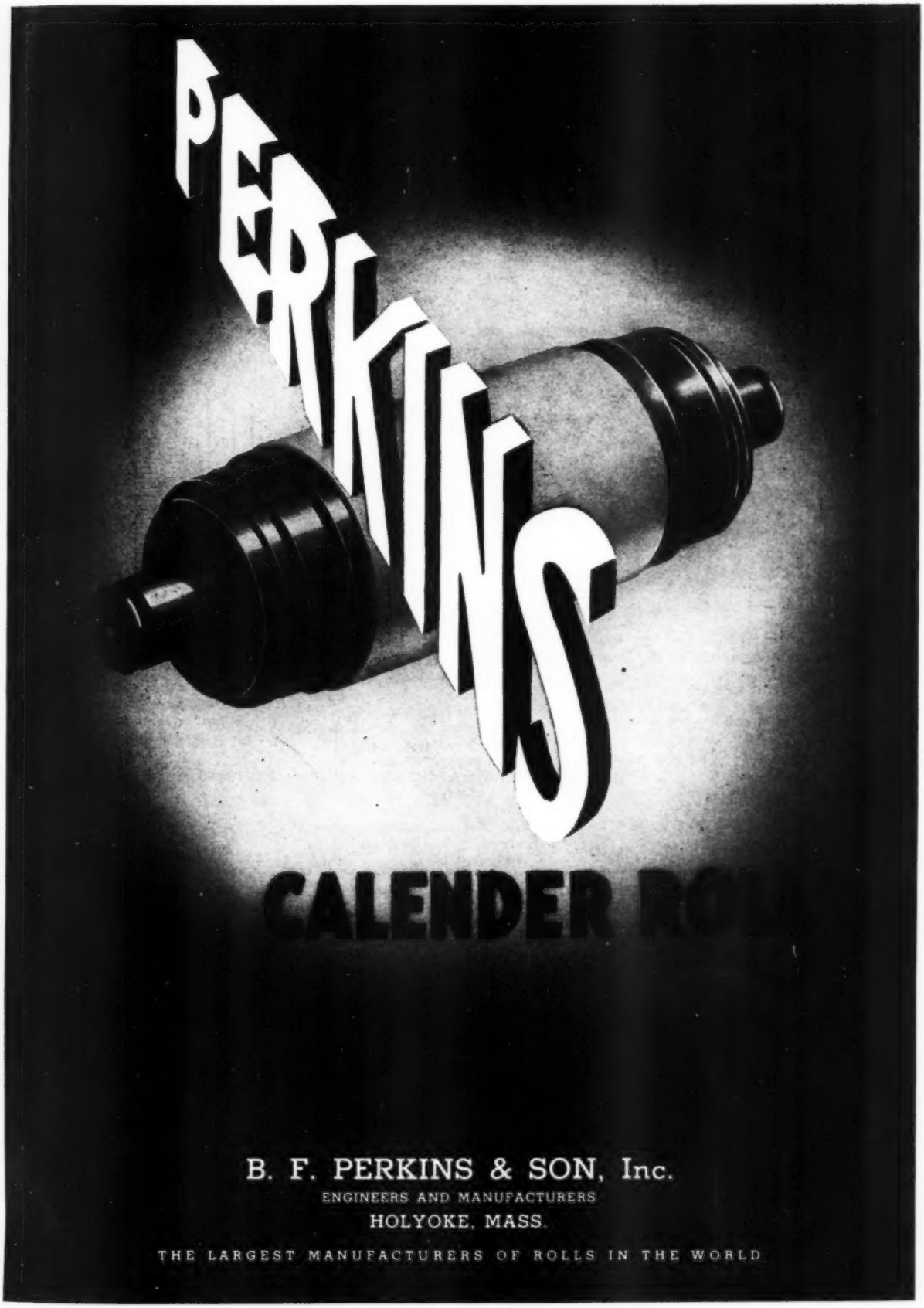
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tiplying by 100. The standard basis weight of the test sheet is 37 pounds (24 x 36/480). The test sheets trim 10⅜ x 10⅜ inches and weigh 4.56 grams for a standard basis weight of 37 pounds.

Hydration is estimated by the type and color of blister found when the sheet is heated by an open flame. If a large blister of white color pops up, the hydration is very high. If, however, the blister is only small and partly charred, hydration is low. If the sheet begins to burn without forming a blister, there is no hydration.

The next step was to prepare about 2 tons of this fiber for a regular mill trial. The cooking and mechanical refining was carried out at the Forest Products Laboratory in Madison along their standard procedure of preparing neutral semichemical sodium sulphite pulp. The bleaching was done in commercial equipment at Rhinelander in two stages following preliminary small-scale trials at the Madison Laboratory. The yield of bleached pulp was 60% based on the original wood.

The resulting stock hydrated easily and ran well on the paper machine. The sheet had good transparency, greaseproofness, and was fully up to the level of a sheet made from indirect spruce with regard to strength properties.

The consumption of chemicals for the preparation of this pulp can be considered approximately as follows:

Na_2SO_3 as Na_2CO_3 per ton of bleached pulp, lb. 525

$NaHCO_3$ per ton of bleached pulp, lb. 180

Cl_2 per ton of bleached pulp, lb. 325

NaOH per ton of bleached pulp, lb. 40

To prepare 525 pounds of Na_2SO_3 requires 440 pounds of soda ash and 135 pounds of sulphur. At $18.00 per ton of soda ash, $16.00 per ton of sulphur, $40.00 per ton of caustic soda, and $30.00 per ton of chlorine, the cost for chemicals per ton is $12.34.

Power consumption for refining, screening, and pumping is about 550 kw. hr. This amounts to $2.75 at a cost of ½ cent per kw. hr.

Figuring the cost of the wood to produce 1 ton of bleached pulp as $20.00, the total cost per ton of bleached pulp is $33.50 exclusive of labor, plant investment, and overhead. If these items are taken as $35.00 per ton, the total cost of bleached pulp would be $70.12 or approximately $70.00. This cost per ton of pulp is not so very much lower than that for bleached spruce, but at a time when spruce becomes scarcer and scarcer, especially at the increased rate of pulp consumption, it may be worth the while to investigate the advisability of producing special pulps from poplar or other hardwoods that are locally available instead of buying spruce that is difficult to obtain and must be hauled a long distance by rail.

Other advantages of pulping hardwoods by the semichemical process are higher yields and better strength properties.

At the present time the semichemical neutral sodium sulphite process as worked out by the Forest Products Laboratory is ready for commercial application. It has been in use for the production of unbleached pulps for many years, and it has been demonstrated that it is feasible to manufacture a bleached pulp of high brightness, good strength, and good hydrating quality.

It should be possible, however, to work out other semichemical pulping processes that use calcium as a base instead of the costly sodium, and by this substitution semi-chemical hardwood pulps may appear even more attractive than they are now.

Acknowledgment

Acknowledgment is made to C. G. Schultz, who carried out most of the cooking and bleaching experiments, and to the Pulp and Paper Section of the Forest Products Laboratory where the unbleached semichemical poplar pulp was produced.

Peroxide Bleaching of Mechanical Pulps

Influence of Bacteria and Enzymes Part II

R. T. MILLS
W. S. HINEGARDNER
W. O. STAUFFER
Electrochemicals Department
E. I. du Pont de Nemours & Co., Inc.

In the early research and development work on the peroxide process for bleaching groundwood, the possible presence of excessive quantities of catalase in aged pulps was recognized and, consequently, fresh pulps were considered preferable for carrying out laboratory investigations and mill trials. Subsequently, it became apparent that the bleaching results were uniformly better in mills practicing good slime control, indicating that the bacteria and enzymes in groundwood exerted an adverse effect on the peroxide bleaching treatment.

The destructive action of heat (Haldane, J. B. S., Enzymes, p. 153; Longmans Green and Co., New York and London, 1930) (Morgulis Sergius; Beber, M., and Rabkin, L., Studies on the effect of temperature on the catalase reaction I. *J. Biol. Chem* 68, 521-23, 1926), oxidizing agents (Haldane, J. B. S., Enzymes, p. 153; Longmans Green and Co., New York and London, 1930), and the halogens, chlorine and bromine (Gerber, C., Influence of halogens on rennin and peoteolytic enzyme actions. IV. Chlorine and caseination of milk. *Compt. rend. Soc. Biol.* 73, 354-6, 1914) (Haldane, J. B. S., Enzymes, p. 153; Longmans Green and Co., New York and London, 1930) on enzymes, particularly on catalase, has been recognized for many years. An evaluation of catalase-destroying treatments was made to confirm the applicability of these earlier findings to the destruction and control of catalase in groundwood systems.

To facilitate the study of the influence of catalase on peroxide bleaching of groundwood, it was desirable to have a simple method for determining the catalase activity of groundwood slurries.

Figure 1 shows a drawing of the equipment used in this test. A is a 500 ml. large mouth bottle in which the groundwood slurry and peroxide solution is placed for the gas evolution test. B is a 500 ml. large mouth glass bottle used as a water reservoir for tube C. C is a 25 ml. tube calibrated in cc. in which the

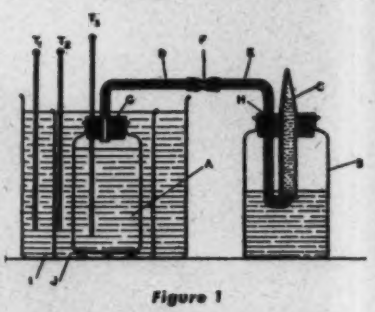

Figure 1

gas evolved in bottle A is collected. D and E are capillary tubes used to connect bottle A with gas collecting tube C. F is a rubber tube used to connect D and E. G is a tight-fitting rubber stopper. H is a loose-fitting rubber stopper with a large hole in which tube C rests during the gas collection period. I and J are water baths used to control the temperature in bottle A within ±0.4 Fahr. of the temperature selected for the catalase activity test. T_1, T_2 and T_3 are thermometers used to control the temperature in bottle A.

Procedure

A 225 gram sample of 5% pulp slurry to be tested for catalase activity, is placed in bottle A and cooled to the temperature at which the catalase activity is to be determined (usually 70 to 75 Fahr.).

A solution of 235 ml. of distilled water containing 25 ml. of 1% H_2O_2 solution (17.5 ml. of 100 volume H_2O_2 diluted to 500 ml.) is placed in a beaker and cooled to the same temperature as the pulp.

Tube C is filled with water at room temperature and placed in bottle B as shown in Figure 1, but capillary E is not as yet connected to D.

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After the groundwood slurry and the dilute peroxide solution have reached the desired temperature for the test, they are then mixed together thoroughly and rapidly in bottle A.

Stopper G, containing thermometer T_s and capillary D, is placed into the top of bottle A. Capillary D is connected to capillary E with rubber tube F in such a manner that the water is expelled from capillary E to the tip of the capillary tubing located inside calibrated tube C.

The selected temperature is maintained within ±.4 Fahr. in bottle A and bath J during the test. This temperature may be 70 to 75 Fahr., depending upon which temperature is closer to room temperature.

The volume of gas collected in tube C over definite periods of time is recorded. The volume of oxygen evolved from a groundwood-peroxide slurry in bottle A over definite periods of time is considered indicative of the catalase activity of that sample of groundwood.

Unless stated otherwise, the pH of the groundwood slurry during the catalase activity test, as reported in this paper, was between 6.0 and 6.5.

Bacteria Count of the Pulp

The procedure used to determine the bacteria count of the pulp is as follows:

The consistency of the groundwood slush is determined and a quantity taken which contains 0.25 gram moisture-free pulp. This groundwood sample is diluted to 500 ml. with sterile water and mixed thoroughly. A 10 ml. sample of this pulp suspension is diluted to 100 ml. with sterile water and mixed thoroughly. Two or more .01 ml. and 1.0 ml. of nutrient agar are placed in sterile Petri dishes and incubated at 86 Fahr. (30 C.). The bacteria colonies are counted after 48 hours and reported as bacteria/gram of moisture-free pulp.

Correlation Between Bacteria Count and Catalase Activity

For the purpose of this investigation, it was desirable to study pulp samples having a wide range of catalase concentrations. Freshly ground pulp was used for the low bacteria counts and the low catalase concentrations. For the higher bacteria counts and catalase concentrations the pulp was allowed to age at room temperature for one to three days; this aging permitted the bacteria to multiply and to produce some catalase. For this reason some of the bacteria counts and catalase concentrations reported in this paper are higher than are normally encountered in mill practice. These high catalase concentrations may be encountered in stored laps of groundwood and are therefore significant in this investigation.

Correlation Between Catalase Activity and Bleachability

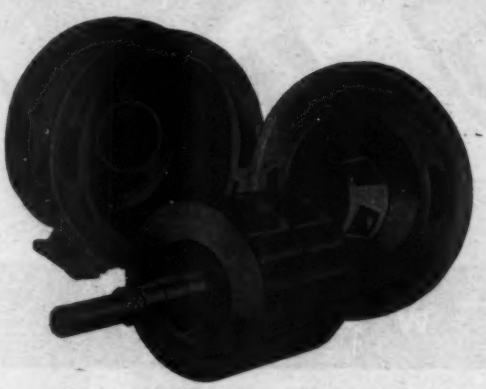
The catalase activity test previously described provides a reliable method of determining whether a pulp contains enough catalase to interfere with the peroxide bleaching process. As compared with bacteria counts, this test has the further advantage that no specialized facilities or techniques are required. The pulps used in this study varied in unbleached brightness from a low of 56 to a high of 64. When bleaching with 1.8% sodium peroxide on the air-dry weight of the pulp at 5% consistency with a low catalase activity, gains of 12 to 14 G. E. brightness points were obtained when starting at a brightness of 56 to 57, whereas gains of 9.5 to 11.5 were obtained when starting at 62 to 64 with other low catalase activity groundwood samples.

For practical purposes the oxygen evolved in 120 minutes may be used to indicate the catalase activity. If the gas evolved under the conditions of test is about 2 cc. or less, the bleaching will not be affected appreciably by catalase. If the gas evolution is between 3 and 7 cc., enough peroxide will be lost so that bleaching is likely to be only fair. Gas evolutions between 2 and 3 cc. are in the overlapping area and bleaching may or may not be slightly affected, depending on the individual pulp. Gas evolutions in the range of 10 cc. or higher show a high catalase activity which will result in poor bleaching.

A very rapid increase in catalase activity takes place when the pulp is stored at 90 Fahr., which is the approximate temperature most favorable to the rapid growth of many nonpathogenic bacteria.

A rapid decrease in activity occurs as the temperature is raised from 110 to 115

SIMPLICITY



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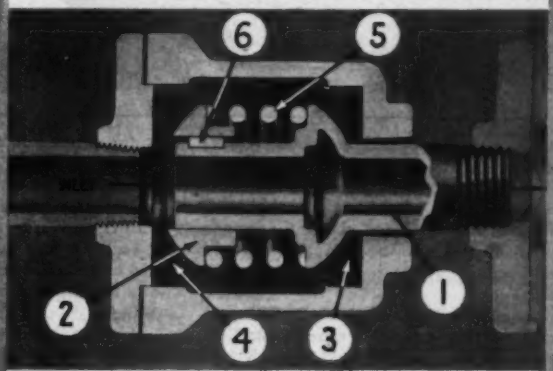

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Fahr. to 160 Fahr. because of the retarding and, finally, killing effect of higher temperatures on bacteria and also due to the destruction of the catalase by heat. The catalase activity of the groundwoods tested in this investigation was entirely destroyed by a one hour storage at 160 Fahr.

Groundwood samples with low and high catalase activities were treated at various *p*H's with sodium hypochlorite and with chlorine water at a temperature of approximately 80 Fahr. for 30 minutes at 5% consistency. Samples of the treated stock were tested for bacteria count and catalase activity. Other samples were adjusted to various *p*H's with dilute sulphuric acid to determine the effect of *p*H alone on catalase activity.

Because of the effect of *p*H on catalase activity, the *p*H of some samples treated with hypochlorite and chlorine were readjusted to approximately 6.5 before making the catalase activity test. The results of this investigation are shown in Tables 1, 2 and 3.

The results given in Tables 1 and 2 show that hypochlorite and chlorine are effective in the destruction of catalase in groundwood pulps, especially when the slurry during the treatment period is at a *p*H of approximately 7.0 or lower. At a *p*H of 8.5, only part of the catalase activity was destroyed in 30 minutes at 80 to 85 Fahr. This treatment at the correct *p*H, time, and temperature would improve the peroxide bleaching results on stored groundwood laps or slurries showing abnormally high catalase activity. The quantities of chlorine and hypochlorite shown in these tests may possibly be reduced in mill practice by applying the required type of chemical to the white water, with the objective of preventing the growth of bacteria and generation of catalase.

High catalase activity may be detected in the peroxide bleaching operation by a rapid decrease in residual peroxide or it may be indicated by the pulp rising rapidly to the surface of the slurry during a

(Turn to page 134)

TABLE 1.—Sodium Hypochlorite Treatment
0.25% Available Chlorine on Moisture-Free Weight of Pulp

G.W. Sample No.	pH in Treatment.	Bacteria Count* Before Treat.	Bacteria Count* After Treat.	pH in Catalase Test	Catalase Activity cc. O_2 in 120 min. Before Treat.	Catalase Activity cc. O_2 in 120 min. After Treat.
1	8.5	B	A	7.2	3.7	0.7
2	8.5	C	B	7.2	9.7	4.9
3	8.5	C	B	7.2	9.4	6.1
4	9.0	D	B	6.3	11.5	4.9
1	7.0	B	A	6.3	3.7	0.6
2	7.0	C	A	6.3	9.7	2.2
3	7.0	C	A	6.3	9.4	0.5
1	3.0	B	A	2.9	3.7	0.6
2	3.0	C	A	2.9	9.7	0.0
3	3.0	C	A	2.9	9.4	0.5
4	3.0	D	A	5.7	11.5	0.0

*Bacteria count:
A = 0-1,000,000
B = 1,000,000-100,000,000
C = 100,000,000-200,000,000
D = 200,000,000-400,000,000

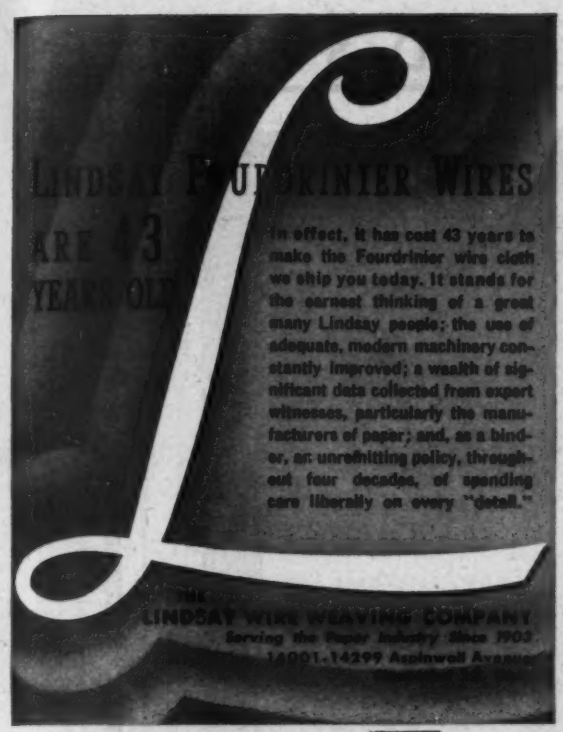
TABLE 2.—Chlorine Treatment
0.19% Available Chlorine on Moisture-Free Weight of Pulp, Added as Chlorine Water

G.W. Sample No.	pH in Treatment.	Bacteria Count* Before Treat.	Bacteria Count* After Treat.	pH in Catalase Test	Catalase Activity cc. O_2 in 120 min. Before Treat.	Catalase Activity cc. O_2 in 120 min. After Treat.
1	3.3	B	A	4.6	3.7	0.0
2	3.3	C	A	4.6	9.7	0.0
3	3.3	C	A	4.6	9.4	1.0
4	3.3	D	A	5.8	11.5	0.0

Note: 0.19% Cl_2 on the pulp is equivalent to 100 p.p.m. on basis of the water at 5% consistency.
*Bacteria count:
A = 0-1,000,000
B = 1,000,000-100,000,000
C = 100,000,000-200,000,000
D = 200,000,000-400,000,000

TABLE 3.—Effect of pH on the Evolution of Oxygen in the Catalase Test

pH	2.5	3.3	4.6	4.5	5.0	5.5	6.0	6.5
cc. O_2 Evolved (120 min.)	1.9	2.3	3.1	4.7	5.8	10.3	12.0	12.3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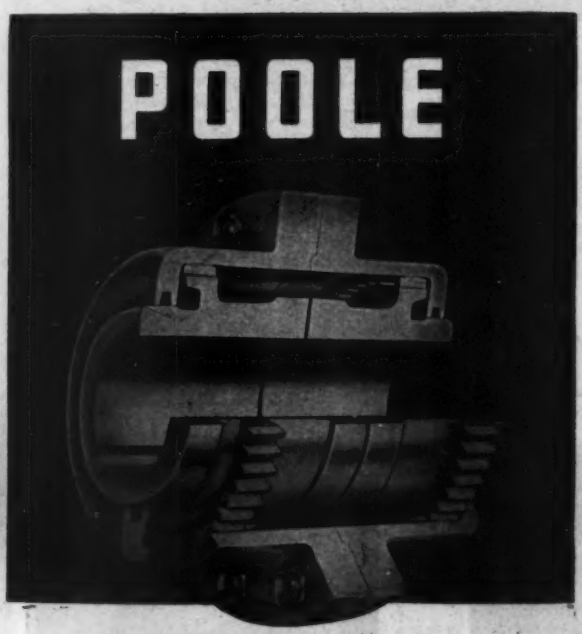

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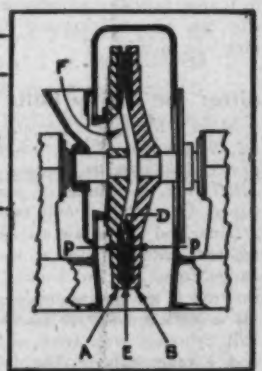

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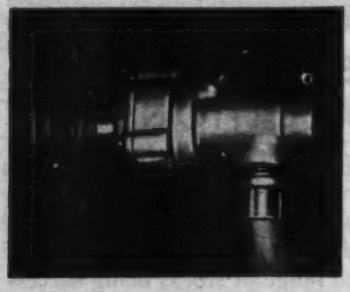
Rotating Water Joint

The Deublin Company, Northbrook, Ill., has announced the Deublin Union, a rotating water joint for cooling revolving shafts, cylinders, or drums, and for handling liquids for heating up to 200 Fahr. The joint features a rotor of stainless steel; a housing, of bronze; and a standard, sealed, "lubricated-for-life" ball bearing. Maximum clearance between the shaft and housing is .0005 in. Rotor concentricity is held to .001 in total indicator reading.



A helical groove on the rotor, running counter to the direction of rotation, according to the manufacturer, prevents leakage between the shaft and housing as well as keeps foreign objects from lodging between the two surfaces. A standard oil retainer protects the bearing from possible leakage when the union is not rotating.

The union is made in two types—Monoflow and Duoflow. The Monoflow is for use where liquid can be passed directly through the roller or cylinder being cooled or heated; the Duoflow, where desirable to introduce and drain liquid from one side of roller or cylinder being cooled or heated.

For standard sizes (½, ¾, 1, and 1½ in.) are available in both types; but any size can be manufactured from ¼ in. pipe size to 6 in.

Lifter for Heavy Rolls of Paper

Massey Machine Company, 800 Pearl St., Watertown, N. Y., has announced a device, designated as the *New Massey Roll Lifter*, for the lifting of heavy rolls of paper. Consisting of only two main parts, a center rod and a jaw assembly, the center rod, with a taper at its lower end, hangs from a crane hook. Surrounding this rod is the jaw assembly. This assembly is made up of two jaws composed of half cylinders with teeth on the outside and a taper inside. The jaws are held together with springs and a rod from each jaw extends upward to a ring which surrounds the center rod.

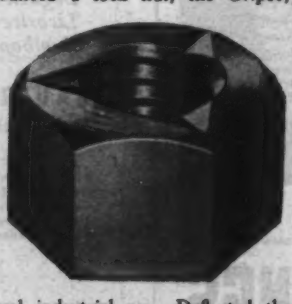
To operate, the lifter is lowered into the core of a roll positioned on end, and then the jaw upper ring is pushed down by hand. Upon doing so, the jaws spread so as to catch the core. Finally, as the center rod is lifted by the crane, the jaws press outward with a force in proportion to the weight of the roll

When the roll is set down, the operator gives slack from the crane. Then he pushes down the center rod by hand, thus causing the release of the lifter.

If it is desired to tip a roll on its side when being released from the lifter, a short piece of 4 in. by 4 in. timber or a small stub roll can be used to advantage. Simply locate the blocking or stub roll on the floor to contact the bottom end of the roll off center thus tipping the roll off the vertical as it comes to rest. In this position, the roll can be brought over onto its side easily.

New Type Lock Nut

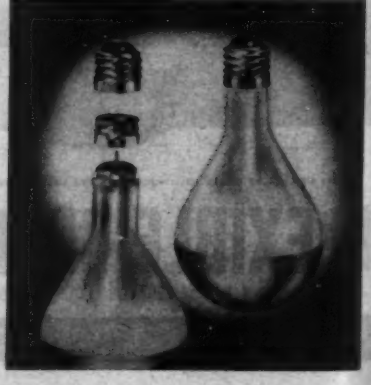
Grip Nut Company, Room 1222, 310 S. Michigan Ave., Chicago 4, Illinois, has announced a lock nut, the *Gripco*, for general industrial use. Deflected threads near the top of the nut, formed by simple, triangular deflections (patented) on the top of the nut, provide a controlled friction lock. The nut is free-spinning until the deflected threads are contacted.



According to the manufacturer, extensive tests conducted by a nationally known testing laboratory prove that the nut can be applied and re-applied many times without appreciable loss in its locking power.

Lamp with New Base Construction

Wabash Appliance Corporation, 345 Carroll St., Brooklyn 31, N. Y., has announced *Superlok*, a construction that consists of a threaded collar screwed into and notch-locked to the lamp base, with its collar claws gripping the dimpled neck of the glass bulb. According to the manufacturer, the design results in a permanent lock that cannot be separated by



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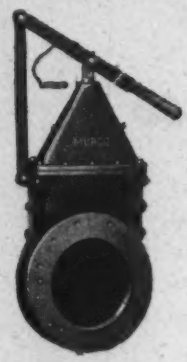
Quick Opening Gate Valve

A quick opening gate valve, designated as the *Murco* gate valve, has been announced by D. J. Murray Manufacturing Co., Wausau, Wis. Designed to permit installation where space is limited and especially applicable for handling pulp and paper stock and water under low pressure, the valve is available in a wide range of



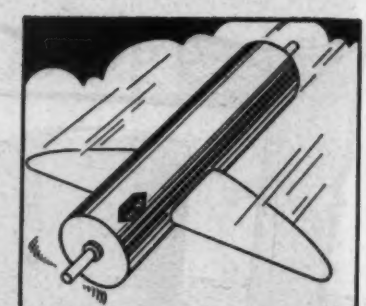
sizes, in cast iron, in cast iron with bronze slides, in bronze, with plain flanges or with flanges drilled for standard or beveled pipe connection.

The gate of the valve can be held in four positions—¼, ½, ¾, and full open through a stop pin—and may be removed simply by loosening the bolts holding the top cover to the body. Likewise, the stem is removable simply by turning 180 degrees in a T-slot.

Cable and Pipe Locator

W. C. Dillon & Co., Inc., 5410 W. Harrison St., Chicago 44, Ill., has announced the *Stewart Cable Tester & Locator Combined*. The unit is designed to locate the exact path of underground

cable or pipe and to indicate the depth of the installation. Weighing approximately 22 lb., the unit, housed in a walnut brown case, is easily portable. The size of the case is only 12½ in. by 7¼ in. by 11 in. high.



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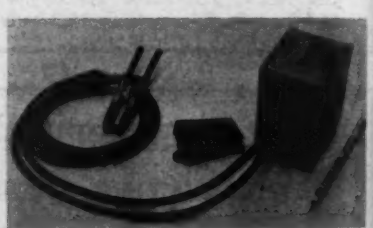
Portable Brazing Set

Westinghouse Electric Corporation, East Pittsburgh, Pa., has announced a line of portable brazing units for joining wire cables, strap connectors, pipe, etc. Made in three sizes—5, 10, and 20 k-va., and requiring only a connection to a 220 volt power source, a set consists essentially of a transformer for providing high currents at low voltage, suitable voltage selectors, controls, and carbon-tipped tongs that can be clamped over the pieces to be joined. The high currents flowing through the carbons bring them to incandescence, quickly raising the material to brazing



temperatures, which are from 1200 to 1500 degrees Fahr.

The 5- and the 10 k-va. units are air-cooled. The 20 k-va. unit is fan-cooled and has a self-contained water cooling and recirculating system for cooling the brazing cables and tongs. The smallest unit weighs about 30 lb.; the middle-size unit, 100 lb.; and the 20 k-va. unit, 250 lb. The corresponding secondary currents are 625, 833, and 1667 amperes.

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200-Ton Alliance 100' Span
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20-Ton Northern 80' Span
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20-Ton Shaw 78'4" Span
20-Ton Shepard Niles 48'6"
20-Ton Shaw 78'4" Span
15-Ton Alliance 50' Span
15-Ton Cleveland 35' Span
15-Ton Morgan 77' Span
15-Ton Northern 53' Span
15-Ton Shaw 82' Span
15-Ton Shaw 77' Span
15-Ton Toledo 82' Span
15-Ton Whiting 74'8½"
12-Ton Morgan 56' Span
10-Ton Alliance 71'10"
10-Ton Cleveland 38' Span
10-Ton Cleveland 50' Span
10-Ton Lane 50' Span
10-Ton Morgan 39'5" Span
10-Ton Morgan 77' Span
10-Ton P & H 57' Span
10-Ton P & H 78' Span
10-Ton P & H 87'6" Span
10-Ton P & H 48'10½" Span
10-Ton P & H 60' Span
10-Ton P & H 80' Span
10-Ton Shaw 68' Span
10-Ton Northern 71'10½"
7½-Ton Erie 70' Span
7½-Ton P & H 30'8" Span
7½-Ton Shepard 36' Span
6-Ton Shaw 25' Span
5-Ton "American" 10' Span
5-Ton Champion 37'6" Span
5-Ton Euclid
5-Ton Milwaukee 39'8"
5-Ton Milwaukee 66'9"
5-Ton Milwaukee 70' Span
5-Ton P & H 45' Span
5-Ton Whiting 80' Span
3-Ton P & H 48'4" Span
3-Ton Shaw 33' Span
3-Ton Whiting 57'3" Span
2-Ton Detroit 28' Span
2-Ton P & H 46'4" Span
2-Ton Shepard-Niles 18'6¼'
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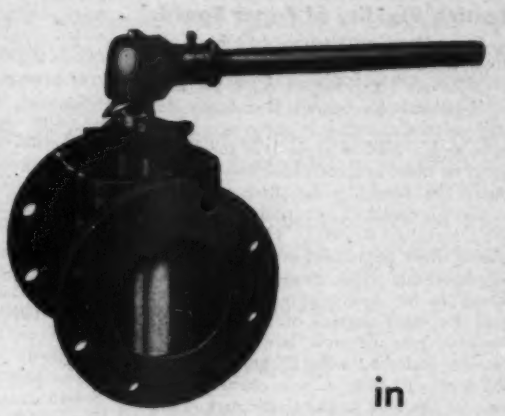

in

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TECHNICAL DEVELOPMENTS

These abstracts are of the latest developments found in the American and foreign press.

Testing Rigidity of Paper Boards

A semi-routine method has been devised for testing the resistance to flexing of relatively rigid fibrous materials, such as fiberboards for boxes and suitcases. A strip of the material is supported at its ends and a load is applied at the center so as to cause a slight deflection by bending. The flexing under these conditions is chiefly elastic, i. e., recoverable after the removal of the load. However a part is also either permanent or else very slowly recoverable. The elastic part has been found to be closely proportional to the load for small degrees of bending. The inelastic part depends largely on other factors, including time of application of the load. Rigidity is here defined as the ratio of the load to the elastic part of the deflection and a test procedure has been developed by which the elastic and inelastic parts of the deflection may be separated.

A suitable form of apparatus consists of a laboratory balance of box-scale type for the application of varying loads, and a low power microscope of fixed magnification with an eye-piece scale for measuring deflection directly.

A conditioned sample strip one inch wide and 3.5 to 4 inches in length is flexed against a metal bridgepiece fixed rigidly over the scale pan, by application of a load. On removal of this load, the original scale reading is not fully recovered. An approximate value for the recoverable part of the deflection can be obtained by taking the strip through a number of cycles of loading and unloading at regular intervals of time. Samples must be as flat as possible, and the test should be repeated with the sample reversed. The effects of thickness and density must be taken into account when comparisons are made. An adjustment factor is given. Length and cross directions must be separately tested. The recording of results is discussed. T. H. Farebrothers. Paper Maker 110, No 1 Ts 2-4 (1945) B.I.P.C. 16, No. 1, 6 (1945).

Effect of Salts on the Freeness

This is an abstract of work on certain properties of eucalyptus kraft pulps. The influence of small amounts of dissolved salts on freeness and on sheet properties was studied. The influence on freeness is a function of the cation and depends on the valency of this ion. The only exception is hydrogen-ion which gives effects that are comparable to those of the tervalent cations.

The influence of the cations parallels the influence of these ions on the electrokinetic potential of cellulose as found by Heymann and Rabinov (J. Phys. Chem. 45, No. 8, 1152-76 [1941].) Inasmuch as the salt effect is bound to affect laboratory pulp evaluations, especially when the results of different laboratories with varying water supplies are to be compared, it becomes of the greatest importance to standardize the pulp evaluation procedures. The suggestion is even made that all laboratories be supplied with de-ionized water. With this end in view the authors have given consideration to the influence of salts at various stages of pulp evaluation.

Because the greatest amount of water is consumed in the actual sheet-making process, it was at this point that the investigation was initiated. Small quantities of the dissolved salts have an amazing influence on freeness, but owing to the limitations placed on the distribution of de-ionized (distilled) water progress has been relatively slow. The Australia Council for Scientific and Industrial Research. Eighth Annual Report (Abstract Only) Forest Products Investigations. Tech. Bull. Paper Makers Assoc. Gt. Britain and Ireland 22, 4-6, 28 (1945); also World's Paper Trade Review 124, No. 15 Tech. Supplement 44 (Oct. 12, 1945).

Fibrous holocellulose from softwoods

By causing 2½ kilos of wood chips to interact with 4 successive charges of .600 grams of commercial sodium chlorite and 12 cubic centimeters of acetic acid in 8 liters of water, it was possible to delignify completely both western hemlock and slash pine. The first treatment was carried out at 60 to 65 C, the second at 65 to 68, the third at 70, and the final (1 hour treatment) at 70-74. The total time of treatment was 21 hours. The fibrous residues, after washing with water, were obtained in 64% yield in the case of the hemlock and 63% in the case of pine.

By Ritter's holocellulose method, the yield for hemlock was 69%. Fractional solubility in increasing concentrations of aqueous NaOH showed a fairly sharp maximum at about 7.5% NaOH. Alphacellulose content (based on the holocellulose) was 76.1% for the hemlock and 79.5% for the pine. In neither case was any betacellulose fraction found. Alkaline refining of either holocellulose at 25 deg. in successive stages, using water and/or aqueous sodium carbonate and sodium hydroxide, indicated that with a 9% caustic soda treatment following treatments with 2% carbonate and 4% caustic, the residue was practically insoluble in 18% NaOH (i.e. virtually alphacellulose). If, however (in the case of hemlock), heating with 0.5% NaOH at 100 deg. for 5 hours was resorted to after such an extraction with 9% NaOH, the yield of residue dropped somewhat and also showed a sharp increase in solubility in 18% NaOH.

After treatment with cold 4% NaOH, the holocellulose from hemlock gave a residue having a degree of polymerization of 1,600. That from slash pine holocellulose similarly treated was 1,095. Chloriting had very little effect on the degree of polymerization of cotton. Comparative beater tests were made for undried holocellulose from pine and for a moderately strong kraft made from the same wood. Data are given for beating time, freeness, burst, tear, fold, and shrinkage of pulp sheets at 40 lb. basis weight. The holocellulose showed a characteristic rapid drop in freeness from the initial 610 to 25 within 15 minutes. The high initial burst of the hollocellulose sheet showed practically no change on beating. With the exception of tear, the holocellulose showed greater strength properties than did the kraft pulp. Thirty one recent references are given. Edwin L. Lovell. Ind. Eng. Chem. 37, 1034-7 (1945).

Reclaiming Valve Plugs By Metallizing

The replacement of 56 plugs in the revolving automatic valves controlling the operation of the 14 Waterous magazine grinders of a mill was avoided by spraying the worn plugs with No. 1 Metcoloy. After about six months of operation the first repaired valve was inspected and found in excellent operating condition without signs of wear. Each plug originally weighed about 100 lb. The writer figures that by the metallizing treatment, the savings per valve amounted to about $63.00 and 88 lb. of bronze metal. William Boucher. Pulp Paper Mag. Canada 46, No. 11,858 (Oct., 1945).

◆

Peroxide Bleaching . . .

(Continued from page 128)

bleach at low consistency. High catalase activity may be confirmed by the test described in this paper and a chlorine type of treatment may then be used to improve the peroxide bleaching results. It should be pointed out, however, that groundwood pulps will drop in brightness during an aging period and the final bleached brightness may not return to that of freshly ground pulp bleached with peroxide.

Bleaching tests were made on four portions of a pulp sample as follows: a. freshly ground-low catalase; b. freshly ground and treated with 0.19% Cl_2 on pulp (100 ppm on the water at 5% consistency)—low catalase; c. aged 1 day—high catalase; and d. aged 1 day and then treated with Cl_2 as in (b)—low catalase.

The addition of chlorine in the amount used had no significant effect on the original bleachability. Aging this same pulp for one day caused a reduction in bleachability of 2 to 3 points. Treatment of the day-old pulp with chlorine restored the bleachability to substantially the original level.

The catalase activity which exists in fresh pulps in mills having good slime control systems has been observed to be at such a low level as to have no significant effect on the peroxide bleaching process. It is, therefore, expected that no difficulty will be encountered when bleaching a fresh normal groundwood pulp with peroxides if a mill is operating an efficient slime control system.

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Murco QUICK OPENING GATE VALVE

FOR any place where low pressure valves are required, especially for handling pulp and paper stock and water under low pressure, the Murco Quick Opening Gate Valve can be opened in a fraction of the time required to open a screw type valve. Easily cleaned . . . slide can be held in four positions . . . easily removed from valve without disconnecting valve from the pipeline—simply remove the bolts holding the bonnet to the body of the valve. Practically free from maintenance as there are no threads on the operating part of stem to wear out, and the gate cannot come loose from the stem. Available in all cast iron, cast iron with bronze slides, and all bronze, with plain flanges or drilled for spiral bevel pipe. Complete details upon request.

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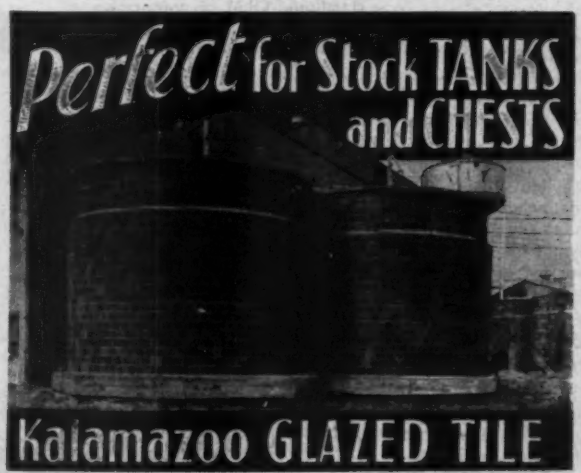
Perfect for Stock TANKS and CHESTS



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WELL WATER SYSTEMS
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PAPERMAKING PATENTS

IN THE UNITED STATES—Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington 4, D. C.

Paper-Coating Composition

Patent No. 2,370,269. Charles W. Stewart, River Forest, Ill., assignor to Corn Products Refining Company, New York, N. Y., a corporation of New Jersey. No Drawing. Original application October 1, 1941. Serial No. 413,128. Divided and this application September 13, 1943. Serial No. 502,198. 1 Claim. (Cl. 106—150).

Composition of matter suitable for coating paper comprising the following substances in quantities, by weight, substantially as follows: zein 12 to 32 parts; sulphonated tall oil 4 to 12 parts; potassium rosin size made from hydrogenated rosin 4 to 20 parts; sodium hydroxide 0.3 to 0.75 part; water 150 to 400 parts; china clay 200 parts; heat gelatinized tapioca starch 2 to 10 parts.

Machine for the Coating of Webs of Paper and Like Absorbent Material

Patent No. 2,368,176. Arthur Ronald Trist, London, England. Application September 17, 1941. Serial No. 411,130. In Great Britain September 20, 1940. 4 Claims. (Cl. 91—43).

1. A machine for coating absorbent continuous webs with a substance suspended in an oil phase emulsion containing finely divided water as the disperse phase, said machine comprising a relatively resilient movable support in contact with one surface of said web, means for supplying the emulsion to the moving surface of said web not in contact with said support and a stationary blade means including a knife edge portion and means to urge said knife edge portion resiliently into contact with the emulsion coated surface of said supported moving web.

Safety Paper and Preparation Thereof

Patent No. 2,363,330. Donald T. Jackson and John L. Parsons, Erie, Pa., assignors to Hammermill Paper Company, Erie, Pa., a corporation of Pennsylvania. No Drawing. Application July 22, 1940, Serial No. 346,870. 20 Claims. (Cl. 117—1).

16. A method of preparing safety paper comprising treating paper with a solution of a light stable substantially colorless organic compound having at least one six membered unsaturated heterocyclic ring containing two hetero atoms para to each other, at least one of said hetero atoms being nitrogen.

Method of Finishing Paper

Patent No. 2,366,563. Van L. Shaw, Chicago, Ill. Application August 3, 1940. Serial No. 350,955. 2 Claims (Cl. 92—68).

1. In the process of finishing paper stock, the method which includes suddenly reducing the temperature of the paper promptly after its delivery from a paper machine without substantially altering its moisture content, and by means which lowers the temperature of the paper to approximately the room temperature of the plant in which it is being handled.

Paper-Coating Composition and Method of Making Same

Patent No. 2,369,766. George Witty, New York, N. Y. No Drawing. Application May 12, 1942. Serial No. 442,727. 2 Claims. (Cl. 106—157).

1. A composition adapted for use in forming a paper coating solution consisting of 50 parts with milk albumin, 25 parts potato starch, 5 parts kaolin, 2 parts borax, 2 parts sodium stannate, 1 part nitrobenzene, 5 parts glucose and 5 parts scrap leather solution which is composed of water, urea, ethylene glycol and phenol, all the parts being by weight.

Method of Making Coated Paper

Patent No. 2,364,505. Eugene G. Bennett, Hamilton, Ohio, assignor to The Champion Paper and Fibre Company, Hamilton, Ohio, a corporation of Ohio. Application July 13, 1940. Serial No. 345,404. 9 Claims. (Cl. 117—62).

1. Process of making coated paper which comprises applying an aqueous coating composition containing casein and pigment to paper and allowing the casein present in the moist coating layer on the paper to react with formaldehyde at a pH between 9.0 and 10.5.

Vortex Separator Apparatus For Treating Paper Pulp

Patent No. 2,375,826. Harold Eric Baliol Scott, London, S. E. 1, England, assignor to Vickerys Limited, London, England. Application July 22, 1940, Serial No. 346,781. In Great Britain July 26, 1939. 10 Claims. (Cl. 92—28).

1. In a paper pulp separator, the combination with a vortex vessel having a pulp inlet tangential to said vessel at the upper end thereof, and a central pulp outlet pipe extending through the upper end of said vessel to a distance below said inlet, of a baffle dividing the vortex vessel below said outlet pipe into a vortex chamber above said baffle and a settling chamber below said baffle communicating only through a restricted annular passage between the periphery of said baffle and the wall of the vessel, and a skirt supported within said vessel beneath said baffle prolonging said annular passage, there being a second passage providing for upward flow from within said skirt outwardly into said restricted passage around said baffle, and means for collecting material which settles in settling chamber.

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In board mills this winder is used in connection with the board machines and as a rewinder in the finishing rooms. In such work CAMACHINE 14 operates at speeds up to 800 F.P.M. In whatever application it may be used, this unit has all of the notable features found in CAMACHINES of greater widths and speeds.

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New Catalogues and Publications

W. H. and L. D. Betz, Philadelphia 24, Pa.—"Some Water Problems of the Paper Industry," is the title of a paper (Tech. Paper No. 101) reprinted from the Fifth Annual Water Conference proceedings of the Engineers Society of Western Pennsylvania." This paper is by Lewis B. Miller, chairman of the Water Committee of TAPPI, chemical engineer, consulting division of the Betz organization. Mr. Miller also is chairman of the Water Committee of TAPPI.

The Blackburn-Smith Manufacturing Co., Inc., 95 River Street, Hoboken, N. J.—A new catalogue is devoted to descriptive material and illustrations of The Refiner, this company's pressure-leaf type filter for clarifying or polishing. Among applications mentioned for this filter are photographic laboratories and chemical plants where ultra filtration is not required.

Cambridge Instrument Company, 3701 Grand Central Terminal, New York 17, N. Y.—A new bulletin, No. 194-SA, illustrates and describes the four models of Cambridge portable Surface Pyrometers: roll, extension, mold, and needle. Lists of typical applications accompany the descriptions of each model. Among the 33 illustrations are the following applications: checking temperature of dryer rolls in paperboard mill; testing surface temperature of dryer rolls in paper mill; measuring temperature of rubber calendering roll.

Chain Belt Company, 1600 W. Bruce St., Milwaukee 4, Wis.—The complete line of Rex sanitation and liquid clarification equipment is presented in a new forty-four-page book well illustrated with pictures, drawings and diagrams. Rex products described include conveyor sludge collectors and Tow-Bro sludge removers, grit collectors and washers, Verti-Flo thickners, skimmers, Aero-Filters, Floctrol, rapid mixers, gravity waste water-oil separators, and water screens. For copy, write for bulletin No. 46-3.

The Cleveland Worm & Gear Company, 3277 East 80th St., Cleveland 4, Ohio—Pictorial three-color bulletin, "Clevelands in the Modern Production Flow," subtitled "Mixing and Grinding," describing the applications of worm gear speed reducers to various types of mixing and grinding equipment. May be obtained upon request.

Cochrane Corporation, 17th St. below Allegheny Ave., Philadelphia 32, Pa.—New Publication 4150 tells the story of the Cochrane Safety Relief Valve, its numerous applications in relief of steam, air, gas, gasoline and oil vapors, water, etc., and adaptableness to other services. This well illustrated publication is yours for the asking.

Dow Corning Corporation, Midland, Mich.—"Silastic Facts No. 1A" contains information about some of the established uses for this exceptionally heat-stable, semi-inorganic, rubber-like material as well as tables giving the physical and electrical properties and the chemical resistance of the six Silastic stocks now available in commercial quantities.

Elgin Softener Corp., Elgin, Ill.—The benefits and economies of soft water are described in Bulletin 607. The efficacy of the Elgin postwar water softener is compared with other softening methods. Other features covered include prevention of zeolite loss, data on treating water correctly for boiler lines, auxiliaries and processing; and one section tells how to modernize existing water softeners. Copies sent on request.

Filtration Engineers Incorporated, 858 Summer Ave., Newark 4, N. J.—A new bulletin, No. 101, describes Rotary Vacuum Filtration. There are sixteen pages of information and illustrations on compression mechanism, washing mechanism, drum-dryer combinations, repuddling of starches, construction details, and typical applications of rotary vacuum filters. Available on request.

General American Transportation Corporation (General American Process Equipment Division), 420 Lexington Avenue, New York 17, N. Y.—A four-page bulletin describing the Conkey Rotary Disc Vacuum Filter, with information on the application, operation, construction, auxiliary equipment, standard sizes, weights and dimensions applicable to this filter.

General Detroit Corporation, 2270 East Jefferson Avenue, Detroit 7, Mich.—As a further step in this company's program of teaching the right protection for every fire hazard, distribution is now being made to safety engineers, fire protection officials and other executives concerned with fire protection, of an instructive file folder. Designed to fit all standard file drawers, the folder is intended to hold information pertaining to fire extinguishers. Material printed on the inside of the folder includes sketches of the five principal types of fire extinguishers; classes of fire for which each is recommended, Underwriters' Laboratories rating for each and other data on the operation, recharging and effectiveness of extinguishers, etc. Copies may be obtained by executives by writing the General Detroit Corporation, 2270 East Jefferson Avenue, Detroit 7, Michigan, or the General Pacific Corporation, 1800 South Hooper Street, Los Angeles 21, California.

Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y.—Catalogue for 1946 listing all of the company's scientific publications on chemistry, physics, mathematics, engineering, and geology. Forty-six pages of information on the various volumes, together with an abbreviated listing of the contents.

Metallizing Engineering Company, Inc., 38-14 30th St., Long Island City 1, N. Y.—The Metco Type Y Metallizing Gun, designed and built for heavy duty continuous operation, is graphically presented in a special booklet just issued. Sectional views of the gun are illustrated, color being used to indicate the integral working parts of the gun. Tables show spraying speeds of various metals and actual consumption of oxygen and acetylene per pound sprayed.

Oakite Products, Inc., 16 Thames St., New York 6, N. Y.—A four-page special report on the maintenance of humidifying equipment in industries where relatively high humidities are essential in connection with production, processing operations or product storage, and describing the company's recent development, Oakite Airefiner No. 52. A copy of this report may be had on request.

Peerless Pump Division, Food Machinery Corporation, 301 West Ave. 26, Los Angeles 31, Cal.—Sixty types and styles of vertical and horizontal pumps manufactured by the company are presented in bulletin B-136, including deep and shallow well pumps, Hi-Lift pumps, and domestic water systems. A copy may be obtained by writing the manufacturer at the above address.

Precision Equipment Co., 32 N. State St., Chicago 2, Ill.—Offers its new Spring-Summer catalogue to all factory superintendents, maintenance engineers, purchasing agents and other plant executives interested in industrial equipment and supplies. Listed is a complete line of mill supplies as well as fans, steel shelving, lockers, electric tools, filing cabinets, a slide rule accurate to five places, etc.

Herman H. Sticht Company, Inc., 27 Park Place, New York 7, N. Y.—The new Universal Type Hand Tachometer, Type U, is described in this company's bulletin No. 750 just released. The principle and advantages of these tachometers, which are imported from Switzerland, are explained, and instructions are given for their use. Bulletin No. 750 may be obtained by writing A. H. Volker, % the above company; and tachometers can be repaired by sending them, charges prepaid, to the company's service department at 24 Murray Street, New York, N. Y.

Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y. — This company has just published Catalogue No. 6, "Low and High Lift Platform Trucks." Battery specification charts are shown for each type of truck, and their mechanical and electrical features are described and illustrated. The company's Model R-3 tractor, said to be the smallest three wheel tractor, is also shown.

Books

Cast Iron in the Chemical and Process Industries—This paper-covered pamphlet of 28 pages is the work of F. L. LaQue, head of the corrosion engineering section of the International Nickel Company, Inc. It includes tabulated information covering results of laboratory and plant tests with more than 300 corrosive media. Arranged alphabetically, the tabulation begins with acetic acid and is completed with zinc sulphate.

In addition to this tabulation, there are three other tables: namely, chemical liquids regularly handled by cast iron pumps, chemicals regularly handled by cast iron valves, and corrosive chemicals resisted satisfactorily by high silicon irons.

The pamphlet, priced at $1.00 a copy, is published by the Gray Iron Founders' Society, Inc., Cleveland 13, Ohio.

A Sanitary Code (containing definitions and interpretations for guidance of manufacturers of paper packaging materials and containers for perishable foods)—Written by J. R. Sanborn, this publication is based on investigations carried out by the Staff of the New York State Experiment Station (Geneva, N. Y.). It is a mimeographed document of sixteen pages, bound in paper cover. The contents cover such items as poisonous and deleterious substances prohibited; fabrication from clean, sanitary virgin stock; adhesives free from toxic, odorous or injurious substances; waterproof and moisture-resisting treatments; protection from contamination; bacteriological standards; plant sanitation; personnel, cleanliness and health; methods of determining compliance with bacteriological standards; and plant inspection reports. Requests for copies of the Code should be addressed to J. R. Sanborn, Division of Bacteriology, New York State Agricultural Experiment Station, Geneva, N. Y.

Vapor Adsorption — Written by Edward Ledoux, this book is divided broadly into four parts: namely, Static Adsorption, Saturation of Air, Dynamic Adsorption, and Industrial Applications. The text, shaped up primarily to meet the needs of engineers, is illustrated with numerous diagrams and illustrations. Published by Chemical Publishing Co., Inc., 26 Court Street, Brooklyn 2, New York, the book totals about 400 pages. It is priced at $3.50 a copy.

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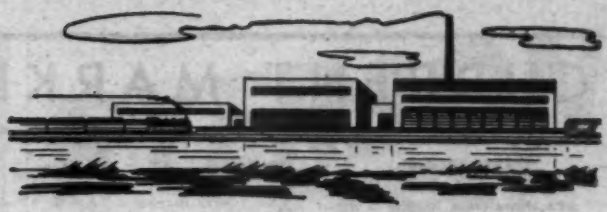

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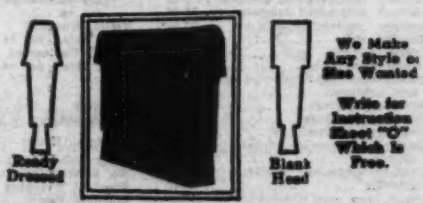

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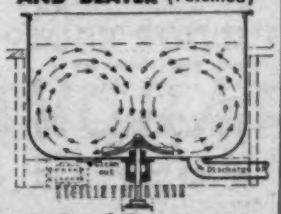

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CURRENT MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

OPA ceiling prices in sales to consuming mills delivered buyer's usual receiving point, with brokers' allowance not in excess of 5 per cent.

	per cwt.
Blue Overalls	-5.50
Corduroy, Men's	-3.50
Corduroy, Ladies'	-3.00
Washables, No. 1	-3.00
Percales	-4.75
New Soft Blacks	-3.75
Light Prints, No. 1	-4.50
Khaki Cuttings—	
Bleachable	-4.25
Unbleachable	-3.50
New White Canvas	-6.50
New Mixed Blacks	-3.25
Canton Flannels, Bleached	-7.00
Shirt Cuttings—	
New White No. 1	-7.25
No. 1 White Headings	-7.25
White Shrunk	-5.00
Silesias No. 1	-5.75
New Unbleached	-7.50
Fancy	-3.50
Linen Cuttings—	
American	-5.00
White	-14.00
Gray	-14.00

RAGS (Domestic)

f. o. b. New York City

OLD RAGS

OPA ceiling prices in sales to consuming mills f. o. b. cars at points of shipment, with brokers' allowance of $1 to $2 a ton depending on the value of the grade involved.

	per ton
Roofing—	
No. 1	$1.00
No. 2	29.00
No. 3 and No. 4	37.00
Twos and Blues—	
Repacked	44.00
Thirds and Blues—	
Repacked	44.00
Miscellaneous	36.00
Whites, No. 1—	
Repacked	76.00
Miscellaneous	64.00
Whites, No. 3—	
Repacked	58.00
Miscellaneous	53.00

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shappories	

ROPE and BAGGING

f. o. b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	Nominal
Domestic	$4.00 to 4.25
Wool Tares—	
Light	4.00 to 4.25
Heavy	4.25 to 4.50
No. 1 Scrap Bagging	3.50 to 3.75
Manila Rope—	
No. 1 large	-*115.00
No. 1 small	-*105.00
Sisal Rope—	
No. 1 large	-*85.00
No. 1 small	-*80.00
New Burlap Cuttings	5.75 to 6.25
Jute Threads—	
Foreign (Nom.)	6.25 to 6.75
Domestic	5.50 to 6.00
Strings—	
No. 1 sisal	-*80.00
No. 2 sisal	-*60.00
Soft jute	5.00 to 5.50
Mixed	1.75 to 2.00

*OPA ceiling price per ton f. o. b. shipping point.

WASTE PAPER

OPA ceiling prices f. o. b. points of shipment for machine compressed bales weighing not less than 500 pounds (with differential of $5 per ton less on certain grades for loose or bundled stock), and brokers' allowance of 4 to 9 per cent.

	per ton
Shavings—	
White Rev. Cuts, One-Cut	$7.50-
Hard White Env. Cuts	62.50-
Hard White, No. 1	57.50-
Soft White, No. 1	50.00-
Soft White, One-Cut	37.50-
Soft White, Misc.	42.00-
Fly Leaf, No. 1	32.50-
Fly Leaf, Woody, No. 1	25.00-
No. 2 Mixed Col. Woody	18.00-
Flat Stock—	
No. 1 Heavy Books and Magazines	38.50-
Mixed Books	22.00-
Ledger Stock—	
No. 1 White	46.00-
No. 1 Mixed (Colored)	40.00-
Manilas—	
New Env. Cuttings	52.00-
New Env. Cuts, One-Cut	37.50-
Extra Manilas	29.00-
Manila Tab Cards, Free of Ground Wood	45.00-
Ground Wood Manila Tab Cards	27.00-
Kraft—	
Envelope Cuttings	45.00-
Mixed Env. or Bag Cuts	35.00-
Tripled Sorted No. 1 Brown	50.00-
New 100% Cor. Cuts	45.00-
No. 1 Old Assorted	32.00-
News—	
White Blank	32.00-
Oversize	22.00-
No. 1 Baled	20.00-
Old Corrugated Containers	20.00-
New Corrugated Cuts	18.00-
Mill Wrappers	22.00-
Box Board Chips	14.50-
No. 1 Mixed Paper	10.00-

CHEMICALS

f. o b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.25-
Ground, cwt.	4.00-
Powdered, cwt.	4.40-
Blanc Fixe—	
Pulp, bulk, ton	40.00 to 46.50
Dry, barrels, pound	60.00 to —
Bleaching Powder—	
Drums, cwt.	2.25 to 2.10
Casein (Domestic Standard)—	
20-30 mesh (bags), lb.	24.00 to 24.75
80-100 mesh (bags), lb.	—
Argentine, lb.	24.00 to 24.75
China Clay—	
Domestic Filler Bulk (mine) ton	9.00 to 15.00
Domestic Coating Bulk (mine) ton	12.00 to 22.00
Imported (ship side) Bulk (lump) ton	14.00 to 25.00
Chlorine—	
Tank cars (wks) cwt.	2.00 to 2.25
Gelatine (silicin), lb.	.90 to .95
Glue, (C.P.) drums, lb.	17.25 to 17.75
Litharge, powd., bbl., lb.	.00 to .00
Rosin (Gum)—	
New York, per 100 lbs.	
E	6.74—
F	7.37—
G	7.41—
WW	8.17—
Rosin (Wood), carlots	4.50—
Salt Cake—	
Dom. bulk (wks) ton	15.00 to 16.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	20.00 to —
Soda Ash—	
Bulk (works), cwt.	.90 to .95
Paper Bags, cwt.	1.05 to 1.35
Barrels, cwt.	1.05 to 1.25
Soda (Caustic)—	
Solid, drums, cwt.	2.30-
Ground and flake, drums, cwt.	2.70 to 2.95
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.05
40 deg., 55 gal. drums, (works) cwt.	.90 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	3.72-
Pearl, barrels, cwt.	3.83-
Paper (Bp.) bags, cwt.	3.83-
barrels, cwt.	3.93-
Sulphur (Crude)—	
(Mine) bulk, long ton	18.00 to—
Talc—	
Dom. 100 lb. bags (mine) ton	16.00 to 21.00
Canadian	24.00 to
Titanium Dioxide—	
Barium Pig., bbls., lb.	.05¾ to .06
Calcium Pig., bbls., lb.	.05 to .05¼
Zinc Sulphide, bbls., lb.	5.00 to 6.10

WOOD PULP

OPA maximum prices applicable to wood pulp delivered to consumer mills located East of the Continental Divide exclusive of Denver, Colo. (West of the Continental Divide and in Denver, Colo., ceilings are $6 per ton lower):

Bleached softwood sulphite	$6.00
Unbleached softwood sulphite	74.00
Bleached hardwood sulphite	63.50
Unbleached hardwood sulphite	71.50
Northern bleached sulphate	80.00
Southern bleached sulphate	79.00
Northern semi-bleached sulphate	82.00
Southern semi-bleached sulphate	75.00
Northern unbleached sulphate	72.00
Southern unbleached sulphate	62.50
Bleached soda	76.00
Unbleached soda	72.00
Ground wood pulp	50.00
Ground wood—paper machine dried and mutilated	53.00
Sulphite screenings	43.50
Sulphate screenings	33.00
Ground wood screenings	32.00
Northern unbleached sulphate sldorums	73.00
Southern unbleached sulphate sldorums	62.50
Standard news print sldorums	50.00

PAPER

f. o. b. New York City

Boards—	per ton
Binders	90.00—
Chip	52.00—
Chip, tube and can	55.00—
Chip, full-blending	57.50—
Chip, sgl. mia. lined	64.00—
Coated, white patent .016	82.00—
.020 and heavier	77.00—
Kraft liner	62.00-
News	52.00—
Container	54.00 to 56.50

Book Papers—OPA base maximum prices per cwt. 4 cases or equivalent, f. o. b. mill with quantity, weight, manufacturing and other differentials allowed:

Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	9.25
B Grade E. F.	9.85
C Grade E. F.	9.55
D Grade E. F.	9.25
No. 2 Uncoated Offset 4 sides. White	8.45
Coated White (Trimmed 4 sides)	
No. 1 Glossy	13.65
No. 2 Glossy	12.40
No. 3 Glossy	11.60
No. 4 Glossy	11.15
C2S Offset	10.40
C1S Litho (Varnish)	10.05
C1S Litho (Non-Varnish)	9.80

Writing Papers—OPA base maximum prices per cwt. on writing papers, f. o. b. mill with name, quantity, packing and other differentials allowed:

Rag Content Bond—	per cwt. 20 lb.	16 lb.
Extra 100% Rag	34.00	34.00
100% Rag	32.00	32.00
75% Rag	30.00	30.00
50% Rag	18.00	17.75
25% Rag	14.00	13.80

Rag Content Ledger—	per cwt. Basis
Extra 100% Rag	35.0
100% Rag	30.0
50% Rag	24.0
75% Rag	21.0
50% Rag	17.0
25% Rag	13.0

Sulphite Bond—	per cwt. 20 lb.	16 lb.
Air dry, watermarked	12.75	12.75
No. 1 (M. F.) watermarked	9.00	8.75
No. 2 (M. F.) watermarked	8.25	8.00
Plain (M. F.) unwatermarked	7.00	6.90

Sulphite Ledger—	per cwt. Basis
No. 1 (M. F.) watermarked	10.00
No. 2 (M. F.) watermarked	9.00
Plain (M. F.) unwatermarked	8.00

Glassine (f. o. b. mill)—	per cwt.
Embossed (25 lb. up)	13.75 to 14.25
Bleached (25 lb. up)	12.75 to 13.25
Unbleach. (25 lb. up)	11.50 to 12.00
Greaseproof—	
Bleach. (25 lb. up)	11.90 to 11.50
Unbleach. (25 lb. up)	10.00 to 10.50

News—OPA Ceilings—	per ton
Rolls, Standard (Contract)	67.00
Rolls, Lightweight (Cont.)	71.00
Rolls (Spot)	(Nominal)
Sheets	75.00

Tissues (Carlots)—	per ream
White, No. 1	1.12½ to 1.30
White No. 2	.90 to 1.00
Bleached Anti-Tarnish	1.15 to 1.30
Colored	—
Anti-Tarnish Kraft	.70-
Manila	.90 to .95
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.80-
Napkins, full crepe and emb'ssed (12½ lb. to M shts.) per cs.	.80-
Toilet, Bleached (M shts.) per cs.	3.65-
Toilet, Unbleached (M shts.) per cs.	4.25-

Towels—	per case
Bleached	3.20 to 3.75
Unbleached	2.60 to 2.80

Wrappings (Kraft)—	per cwt.
Super-Standard	5.25 to 7.00
No. 1 Wrapping	5.00 to 7.00
Standard Wrapping	4.75 to 7.15
Standard Bag	4.87½
Variety Bag	4.62½—

Wrappings (Sulphite and Bleached Kraft)—	
(Rolls, f. o. b. mill)	
Bleached Papers—	per cwt.
M.F. & M.G. Waxing, 30 lb. (Carloads only)	7.25 to 7.50
(10,000 lbs.)	7.50 to 7.75
Drug wrapp. 35 lb.	7.00 to 7.25
Unbleached Papers—	
Cam. Grd. Butch. 40 lb.	5.50 to 5.75
No. 1 Butchers	5.75 to 6.00
No. 1 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	6.25 to 6.50
No. 2 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	6.00 to 6.25
Steam Finish, 30 lb.	5.00 to 5.25
Water Finish, 40 lb.	5.50 to 5.75

Manilas—	
Envp. Mfs., Sub. 16-40 (No. 1)	8.00 to 8.50
Envp. Mfs., Sub. 16-32 (No. 2)	8.75 to 9.00
Envp. Mfs. (Prices based on large sheets untrim'd room-marked, in bdls.)	
Wrapp. Mfs. 35 lb. up—	
No. 1	6.00 to 6.25
No. 2	5.75 to 6.00
M.G. Sulphite and Kraft (other than Waxing)	
Grade A-32 lb.	7.25 to 7.50
Grade B-30 lb.	6.75 to 7.00

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Rails—Plates	Tool Steel	Tubing
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Shafting—Bolts		
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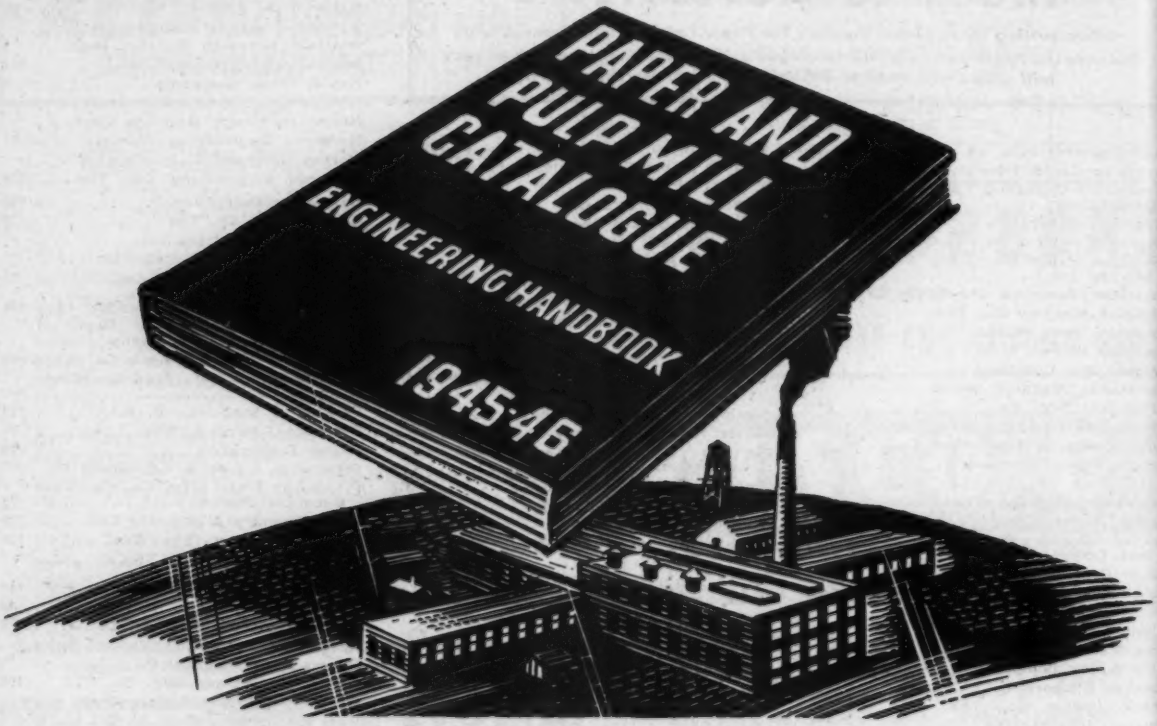

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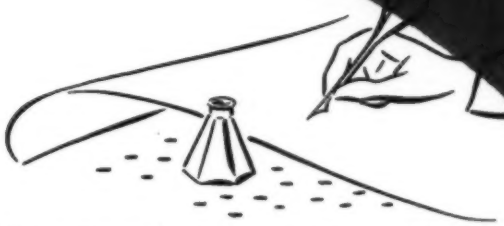

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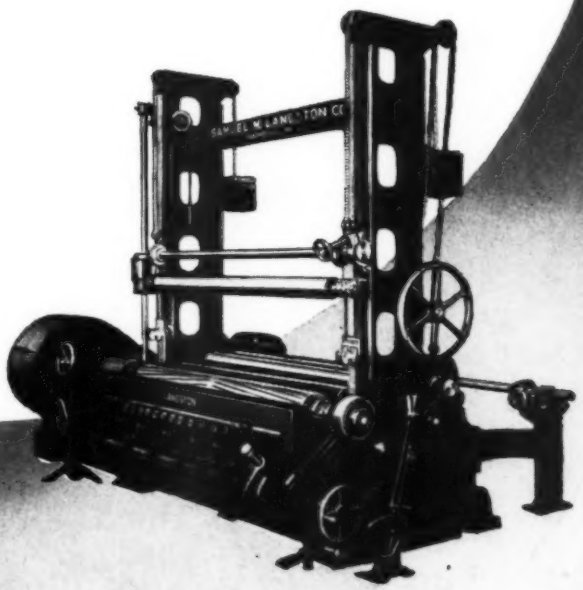

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